THE IRON AGE

THURSDAY, AUGUST 28, 1902.

An Improvement in the Manufacture of Basic Bessemer Steel.

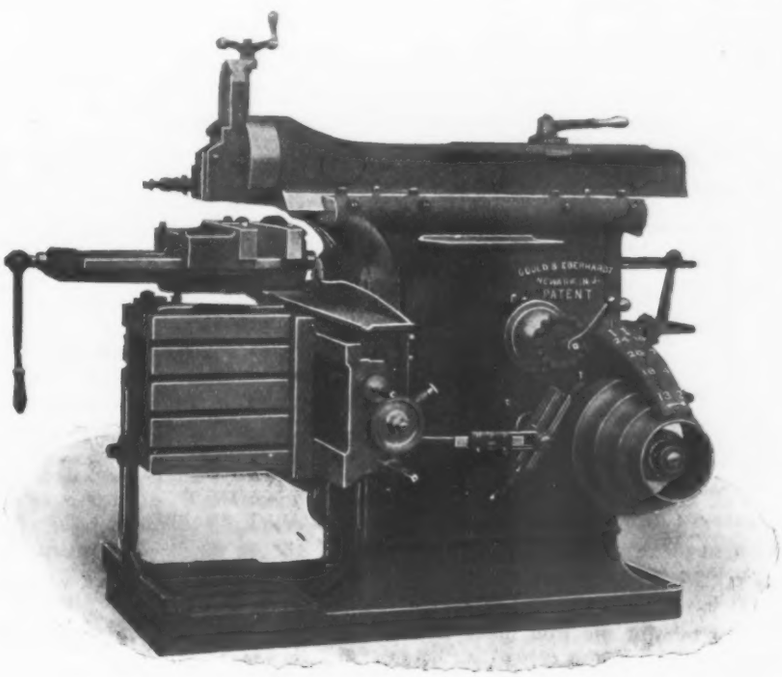
A patent has recently been granted to Samuel McDonald of Youngstown, Ohio, which suggests an interesting improvement in the usual process of manufacturing basic Bessemer steel. Mr. McDonald describes his method as follows:

My improvement consists in providing a receiving tank or furnace of sufficient size to contain at one time the charges from a number of converters. Into this tank I pour the charge of each converter, and from it I take the metal for casting. I test each converter charge in turn, as in the former practice; but instead of holding each charge subject to the result of the test and renewing the blow if too much phosphorus remains I turn the charge without delay into the receiving tank and determine the treatment of the next succeeding charge by the result of the test of the charge which has preceded it. Thus if the test of a given charge reveals the presence of too much phosphorus, though I have already introduced that charge into the receiving tank, I continue the treatment of the next charge not only for such time as is deemed sufficient to reduce to the proper degree its phosphorus element, but for an additional time, and I thereby eliminate so much phosphorus from that charge that when it shall be introduced into the receiving tank the phosphorus element of the entire contents of the tank shall not exceed the proper amount. It is obvious that instead of testing each charge as it goes to the receiving tank I may test the contents of the tank after the introduction of each converter charge and determine the treatment of succeeding converter charges by the results of these tests. By adopting this method of treatment I avoid the delay incident to the former practice as I have described it. My receiving tank is preferably a furnace, and being able to control the heat applied to it I am able to maintain the metal in the tank at the proper casting temperature.

It will be understood that in practicing my invention I may either begin to withdraw metal from the receiving tank after it has been filled and continue to withdraw metal until it is again empty or I may keep adding new converter charges while withdrawing metal for casting. I find it desirable to have two receiving tanks, such as I have described in connection with a Bessemer plant, and to draw from one while filling the other. By employing the receiving tank I am able to remove the phosphorus containing slag before the introduction of spiegeleisen or ferromanganese, and I may thus avoid any deleterious effects of chemical action of the slag upon these substances.

The New Gould & Eberhardt Shaper.

The new extension base shaper built by Gould & Eberhardt of Newark, N. J., is fitted with their cross feed connecting rod, which adjusts itself entirely automatically for any position of the shaper table and does not require the loosening and tightening up of a set screw to adjust. The connecting rod is also fitted with a friction slip, which prevents breaking of the feed gears through accident or carelessness. The vise is formed with a place to strike in order to line up, which prevents bruising the finished ways; it is also so constructed that there is a pulling instead of a pushing strain when tightening up work, thus preventing buckling of the vise screw. The vertical graduations on the bottom of the vise cannot be obliterated. The cross head is held directly to the frame, thereby insuring rigidity. Filter oil hole covers are provided so that only clean oil is admitted to the bearings. Over each cone step, as shown in the half-tone, are figures representing the proper speed for each different length of stroke.



THE NEW GOULD & EBERHARDT SHAPER.

Gould & Eberhardt use a rigid sleeve bearing, shown in section in Fig. 2, on the cone shaft of their shapers, gear cutting machines, &c. The cone C, revolving on the sleeve bearing B, drives the driving shaft A through the clutch flange D by means of pins which are a tight fit in the flange D and an easy fit in the cone C. By employing this mode of construction the entire side

strain of the driving belt on the cone is carried by the rigid sleeve journal, bolted by means of the flange to the side wall of the shaper, as shown at E, the driving shaft being compelled to carry only the torsional strain incidental to the driving of the machine. This construction reduces to a minimum the wear of the cone shaft bearing and insures the proper meshing of the driving gears. With proper attention to lubrication this bearing should outlast the machine. All parts of the sleeve bearing are cast iron.

Pennsylvania's Pig Iron and Steel Produce by Counties.

HARRISBURG, PA., August 22, 1902.—Advance sheets of the report of the Pennsylvania State Bureau of Industrial Statistics, whose figures are officially collected from every establishment in the commonwealth, show that the production of iron and steel in 1901 far exceeded that of the preceding year, which had held the record. Marvelous advances are shown, and once more Allegheny County is the banner county, its production of both steel and iron being greatly in excess of any other county of the State, being indeed about 50 per cent. of the iron and almost three-fourths of the steel gains in both instances over the year 1900.

There were 7,364,295 tons of pig iron made in the State in 1901, against 6,271,688 tons in 1900, 6,542,998 in 1899, 5,367,979 in 1898, 4,617,634 in 1897 and 4,026,350 in 1896, the year when the tide turned for the better in business. The capital invested in the plants necessary to produce the huge total of 1901 was $152,000,000 in round figures, or three times what was invested in furnaces in 1896.

The total production of steel for Pennsylvania in 1901 was 7,959,720 tons, 4,310,144 being Bessemer and 3,554,823 open hearth. The following table will show the growth of the industry since 1896:

Year.	Total.	Bessemer.	Open hearth.
1900	6,256,775	3,488,569	2,702,968
1899	6,446,159	3,971,835	2,398,210
1898	5,275,984	3,357,684	1,848,732
1897	4,318,622	2,848,204	1,421,373
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The balances in these five years were made by crucible and other processes.

The production of pig iron, according to counties, shows that Allegheny County is still far in the lead, producing about one-half of the total tonnage made at the blast furnaces of the Keystone State. A total of 3,685,665 tons was made in the 32 furnaces of the Pittsburgh district, against 3,124,072 tons in 1900, when Allegheny produced 49.031 per cent. of the State's pig iron. Mercer County climbed to 622,877 from 437,754 tons in 1900 and Cambria gained a total of 511,533 tons from 424,056 tons in 1900, all being made by the stacks of the Cambria Steel Company. Lawrence County, which made 365,802 tons in 1900, lost fourth place to Lebanon last year, the stacks in the Cornwall district producing 382,436 tons in 1901, against 235,200 in 1900 and jumping Lebanon County from eighth to fourth place. Lawrence ranks fifth this year, with 359,260 tons, while Dauphin County, with Harrisburg and Steelton furnaces, remains in sixth place, with 312,400 tons, against 276,314 tons made in 1900. Berks, the Reading district, is next, with 265,065, while Lehigh County, once the great iron county of the State, is eighth, with 230,570, whereas a year before it stood fifth, with 279,767 tons. Northampton's production in 1901 was 179,647, a gain of 15,000 tons over 1900. Other counties and their productions are: Montgomery, 170,816; Bedford, 99,534, a gain of 20,000 tons over 1900; Lackawanna, 80,241; Fayette, 77,914; Jefferson, 68,842; Armstrong, 55,000; Delaware, 42,003; Centre, 42,000; Cameron, 37,723; Westmoreland, 37,347; Carbon, 32,227; Bucks, 30,025; York, 15,154; Perry, 13,600; Mifflin, 1954, and Huntingdon, 1953.

The steel production shows that Allegheny gained over 1,000,000 tons, the record being 5,140,580, the greatest ever known, while the production in 1900 was 4,049,-

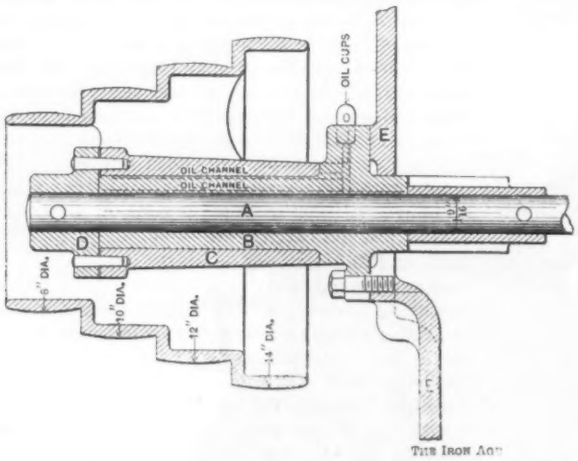
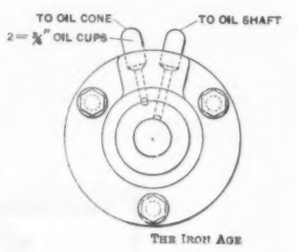


Fig. 2.—Section of Rigid Sleeve Cone Bearing.



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County.	1901.	1900.
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Mercer	217,518	93,842
Montgomery	198,150	None reported.
Westmoreland	152,715	124,746
Northampton	68,796	63,778
Philadelphia	61,111	238,542
Delaware	60,597	35,577
Mifflin	23,101	23,800
Armstrong	14,193	11,226
Wenango	3,900	4,425
York	3,700	None reported.
Berks	3,570	2,253

Montour and Lebanon, which made steel in 1900, are not reported as in the producing list in 1901. E. J. S.

The Atlanta Water & Electric Power Company of Atlanta, Ga., have been organized to build a dam across the Chattahoochee River with the object of furnishing the city of Atlanta with electric power. The following are the officers of the concern: President, S. Morgan Smith, York, Pa.; vice-president, Forest Adair, Atlanta; Board of Directors: S. Morgan Smith and C. Elmer Smith, York, Pa.; George C. Smith, Pittsburgh, Pa.; Forest Adair and J. C. Spalding, Atlanta. The company are capitalized at $1,500,000.

Census Report on Iron and Steel.

More Comprehensive than Any Previous Report.

WASHINGTON, D. C., August 26, 1902.—The report of the Census Bureau upon the manufacture of iron and steel in the United States in the census year 1900 has been completed by Wm. G. Gray, expert special agent. It covers this great industry in a much more comprehensive manner than has been possible at any previous census. A special effort has been made to supply for this report data not gathered by the American Iron and Steel Association, in order to avoid a duplication and to furnish statistics not available for the association's annual reports. As in the census for 1890, this report is divided into four parts, as follows: I. The iron and steel industry as a whole. II. The manufacture of pig iron. III. The manufacture of steel ingots and steel castings and rolled iron and steel. IV. The manufacture of iron blooms and hammered bar iron for sale.

I.—The Iron and Steel Industry as a Whole.

In the following table will be found full and complete data covering the industry as a whole, and showing the number of establishments, capital invested, persons employed, expenses, cost of materials and quantity and value of product for the census year 1900, as compared with 1890:

	1900.	1890.
Number of active establishments....	669	719
Capital	$590,530,484	$414,044,844
Number of salaried officials, clerks, &c.	9,217	4,325
Salaries	$11,741,788	$6,462,236
Wage earners, average number.....	222,607	171,181
Total wages.....	$120,836,338	$89,273,956
Miscellaneous expenses.....	$32,274,100	$18,214,948
Cost of materials used.....	$522,431,701	$327,272,845
Value of products.....	$804,034,918	$478,687,519
Tons of products, gross tons.....	29,508,730	16,264,479

Pennsylvania's Pre-eminence.

For over 100 years Pennsylvania has led in the manufacture of iron and steel in the United States, and in 1900 it still held this position, being far in the lead of any other State in that year. Of the total capital reported, Pennsylvania contributed $321,985,659, or considerably over one-half, as compared with $226,294,407 in 1890, which was then over one-half, and $102,956,223 in 1880, a little less than one-half. In 1900 in this industry Pennsylvania gave work to 110,864 wage earners, almost one-half of the total reported, paying them $61,908,405, or over one-half of the totals in the United States.

In 1890 the average number of wage earners reported by the State was 92,473, or considerably over one-half of the entire number reported, and amount of wages paid was $49,550,665, also much more than half that paid by the country at large. In 1880 the average number of wage earners given employment in Pennsylvania was 57,952, and the wages paid amounted to $25,095,850, being considerably less than one-half of the total wage earners; but they were paid almost one-half of the total wages reported for the country at large.

In 1900 the cost of all materials used by iron and steel establishments, including freight charges in Pennsylvania, was $283,142,785, considerably more than the total cost reported by all the other States in the Union combined. In 1890 the amount reported by Pennsylvania for cost of materials was $180,220,237, and in 1880 it was $92,267,039. The value of the iron and steel products reported by Pennsylvania in 1900 was $434,445,200, or over 54 per cent. of the total value reported. In 1890 the figures for Pennsylvania were $264,571,624, or over 55 per cent., and in 1880 they were $145,576,268, or over 49 per cent.

Position of Ohio and Illinois.

Of the total capital invested in 1900, Ohio, which ranked second in the manufacture of iron and steel, reported $86,477,552, as compared with $37,642,887 in 1890, and $22,807,606 in 1880. The average number of wage earners reported was 33,677 in 1900, 23,546 in 1890 and 20,071 in 1880, the wages paid to these workers amounting to $19,730,469 in 1900, $13,262,141 in 1890, and $8,265,070 in 1880. The cost of materials, including freight charges, was $91,329,307 in 1900, $44,551,301 in 1890, and $23,997,915 in 1880. The value of the products amounted to $138,935,256 in 1900, compared with $65,206,828 in 1890, and $34,918,360 in 1880.

Illinois, which was third in importance in 1900 in the manufacture of iron and steel, had capital invested in that year to the amount of $43,356,239, compared with $34,689,919 in 1890, and $5,795,620 in 1880. The average number of wage earners employed in 1900 was 16,642, compared with 8685 in 1890 and 5253 in 1880. The wages paid amounted to $9,640,716 in 1900, $5,220,883 in 1890, and $2,508,718 in 1880. For materials, the active iron and steel establishments in Illinois paid $41,729,261 in 1900, $30,039,674 in 1890, and $14,977,145 in 1880. The value of their products amounted to $60,303,144 in 1900, $39,011,051 in 1890, and $20,545,289 in 1880.

Combining the leading details for Pennsylvania, Ohio and Illinois the results obtained show that 76.5 per cent. of the total capital reported by all active iron and steel establishments in 1900 was invested in the three States named, against 72.1 per cent. in 1890, and 62.7 per cent. in 1880; that these States employed 72.5 per cent. of the number of wage earners reported for 1900 for the entire iron and steel industry, against 72.8 per cent. in 1890 and 59.1 per cent. in 1880; that in 1900 they paid these wage earners 75.5 per cent. of the total wages paid in the United States to workmen engaged in the manufacture of iron and steel, against 76.2 per cent. in 1890 and 64.7 per cent. in 1880; that in 1900 they paid for materials 79.7 per cent. of the total cost reported by all iron and steel establishments, against 77.9 per cent. in 1890, and 68.6 per cent. in 1880; and that the value of the iron and steel products manufactured within their borders amounted in 1900 to 78.8 per cent. of the total value reported for the country at large, against 77 per cent. in 1890, and 67.8 per cent. in 1880.

Ranking the remaining leading iron and steel manufacturing States according to the value of their products in 1900, New Jersey was fourth, Indiana fifth, Alabama sixth, West Virginia seventh, New York eighth, Massachusetts ninth, Wisconsin tenth, Maryland eleventh, Virginia twelfth, Kentucky thirteenth, Michigan fourteenth and Tennessee fifteenth. In each of these States the iron and steel produced in 1900 amounted in value to over $5,000,000, but less than $25,000,000. In the same year the value of the iron and steel products of none of the other States exceeded $5,000,000.

Comparisons with Previous Census Figures.

The ever increasing consumptive powers of the United States for iron and steel, and the phenomenal growth of the industry as a whole during the last 30 years, are most strikingly shown by comparing the production of 1900 with that of 1870. In the former year the production of iron and steel amounted to 29,508,730 gross tons, while in the latter year it was only 3,263,585 tons, an increase of 26,245,145 tons, or 804.2 per cent. The strong and steady growth of the industry by decades is also forcibly shown by comparing the figures for each of the census periods. In 1870 the total production of iron and steel amounted to 3,263,585 gross tons; in 1880 it had grown to 6,486,733 tons, an increase of 98.8 per cent., and in tonnage of 3,223,148; in 1890 it had jumped to 16,264,478 tons, an increase of 9,777,745 tons, or 150.7 per cent., and in 1900 it reached 29,508,730 tons, an increase of 13,244,252 tons, or 81.4 per cent.

But coexistent with the phenomenal growth of the iron and steel industry from 1870 to 1900, there was a still more wonderful decrease in the cost to consumers of all iron and steel products. Thirty years ago the average price per ton of the total product was $63.49; ten years later, in 1880, the average price was $45.70 per ton; in 1890, ten years ago, it was $29.43 per ton, and in 1900, a year of high prices and of great prosperity, the average price per ton has fallen to $27.24, considerably less than one-half of the price prevailing 30 years ago, and less than two-thirds of the price realized 20 years ago.

The Production Considered by States.

During the census year, 1900, there were 29 States which produced iron or steel in the form of pig iron.

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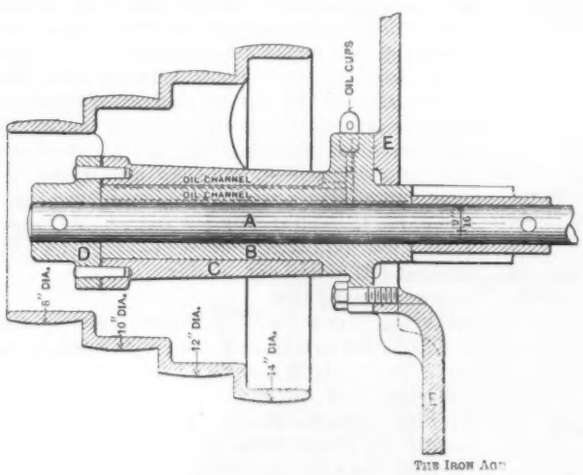

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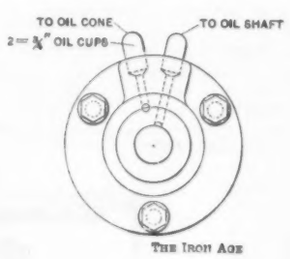

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Of the total capital invested in 1900, Ohio, which ranked second in the manufacture of iron and steel, reported $86,477,552, as compared with $37,642,887 in 1890, and $22,807,606 in 1880. The average number of wage earners reported was 33,677 in 1900, 23,546 in 1890 and 20,071 in 1880, the wages paid to these workers amounting to $19,730,469 in 1900, $13,262,141 in 1890, and $8,265,070 in 1880. The cost of materials, including freight charges, was $91,329,307 in 1900, $44,551,301 in 1890, and $23,997,915 in 1880. The value of the products amounted to $138,935,256 in 1900, compared with $65,206,828 in 1890, and $34,918,360 in 1880.

Illinois, which was third in importance in 1900 in the manufacture of iron and steel, had capital invested in that year to the amount of $43,356,239, compared with $34,689,919 in 1890, and $5,795,620 in 1880. The average number of wage earners employed in 1900 was 16,642, compared with 8685 in 1890 and 5253 in 1880. The wages paid amounted to $9,640,716 in 1900, $5,220,883 in 1890, and $2,508,718 in 1880. For materials, the active iron and steel establishments in Illinois paid $41,729,261 in 1900, $30,039,674 in 1890, and $14,977,145 in 1880. The value of their products amounted to $60,303,144 in 1900, $39,011,051 in 1890, and $20,545,289 in 1880.

Combining the leading details for Pennsylvania, Ohio and Illinois the results obtained show that 76.5 per cent. of the total capital reported by all active iron and steel establishments in 1900 was invested in the three States named, against 72.1 per cent. in 1890, and 62.7 per cent. in 1880; that these States employed 72.5 per cent. of the number of wage earners reported for 1900 for the entire iron and steel industry, against 72.8 per cent. in 1890 and 59.1 per cent. in 1880; that in 1900 they paid these wage earners 75.5 per cent. of the total wages paid in the United States to workmen engaged in the manufacture of iron and steel, against 76.2 per cent. in 1890 and 64.7 per cent. in 1880; that in 1900 they paid for materials 79.7 per cent. of the total cost reported by all iron and steel establishments, against 77.9 per cent. in 1890, and 68.6 per cent. in 1880; and that the value of the iron and steel products manufactured within their borders amounted in 1900 to 78.8 per cent. of the total value reported for the country at large, against 77 per cent. in 1890, and 67.8 per cent. in 1880.

Ranking the remaining leading iron and steel manufacturing States according to the value of their products in 1900, New Jersey was fourth, Indiana fifth, Alabama sixth, West Virginia seventh, New York eighth, Massachusetts ninth, Wisconsin tenth, Maryland eleventh, Virginia twelfth, Kentucky thirteenth, Michigan fourteenth and Tennessee fifteenth. In each of these States the iron and steel produced in 1900 amounted in value to over $5,000,000, but less than $25,000,000. In the same year the value of the iron and steel products of none of the other States exceeded $5,000,000.

Comparisons with Previous Census Figures.

The ever increasing consumptive powers of the United States for iron and steel, and the phenomenal growth of the industry as a whole during the last 30 years, are most strikingly shown by comparing the production of 1900 with that of 1870. In the former year the production of iron and steel amounted to 29,508,730 gross tons, while in the latter year it was only 3,263,585 tons, an increase of 26,245,145 tons, or 804.2 per cent. The strong and steady growth of the industry by decades is also forcibly shown by comparing the figures for each of the census periods. In 1870 the total production of iron and steel amounted to 3,263,585 gross tons; in 1880 it had grown to 6,486,733 tons, an increase of 98.8 per cent., and in tonnage of 3,223,148; in 1890 it had jumped to 16,264,478 tons, an increase of 9,777,745 tons, or 150.7 per cent., and in 1900 it reached 29,508,730 tons, an increase of 13,244,252 tons, or 81.4 per cent.

But coexistent with the phenomenal growth of the iron and steel industry from 1870 to 1900, there was a still more wonderful decrease in the cost to consumers of all iron and steel products. Thirty years ago the average price per ton of the total product was $63.49; ten years later, in 1880, the average price was $45.70 per ton; in 1890, ten years ago, it was $29.43 per ton, and in 1900, a year of high prices and of great prosperity, the average price per ton has fallen to $27.24, considerably less than one-half of the price prevailing 30 years ago, and less than two-thirds of the price realized 20 years ago.

The Production Considered by States.

During the census year, 1900, there were 29 States which produced iron or steel in the form of pig iron,

steel ingots or castings, rolled iron or steel, or hammered blooms and bars for sale, compared with 31 States and Territories in 1890, which manufactured similar products, 32 in 1880 and 25 in 1870. The production of Pennsylvania amounted to 15,291,581 gross tons, as compared with 8,622,745 tons in 1890, 3,229,168 tons in 1880, and 1,640,007 tons in 1870. Of the total production of the whole country Pennsylvania contributed 51.8 per cent. in 1900, against 53 per cent. in 1890, 49.8 per cent. in 1880 and 50.3 per cent. in 1870. During the last 30 years this State has produced practically one-half of the total quantity of iron and steel reported for each of the four census periods named above. From 1890 to 1900 its increased production amounted to 6,668,836 gross tons, or 77.3 per cent., compared with an increase in the whole country during the same period of 13,244,252 tons, or 81.4 per cent. From 1880 to 1890 its output increased 5,393,577 tons, or 167 per cent., while the increased production of the whole country was 9,777,745 tons, or 150.7 per cent. From 1870 to 1880 its production increased 1,589,161 tons, or 96.9 per cent, and the output of the country at large increased 3,223,147 tons, or 98.8 per cent.

Ohio ranked second in production in 1900, 1880 and 1870, its output in the first period named amounting to 5,297,191 tons, against 2,210,296 tons in the second, 830,483 in the third, and 401,579 in the fourth period. Of the total production for the whole country for 1900 Ohio contributed 18 per cent., compared with 13.6 per cent. in 1890, 12.8 per cent. in 1880 and 12.3 per cent. in 1870. Illinois ranked third in production in 1900 and 1890, fourth in 1880 and fifteenth in 1870, its total output in 1900 amounting to 2,954,876 tons, against 1,479,754 tons in 1890, 373,185 tons in 1880 and 23,001 tons in 1870. Of the total production for the whole country Illinois contributed 10 per cent. in 1900, against 9.1 per cent. in 1890, 5.8 per cent. in 1880 and seven-tenths of 1 per cent. in 1870. Alabama was fourth in rank in 1900 and 1890, fifteenth in 1880 and twentieth in 1870, its total production in 1900 amounting to 1,303,595 tons, against 864,120 tons in 1890, 56,237 tons in 1880 and 6304 tons in 1870. Alabama contributed to the total production of the country 4.4 per cent. in 1900, 5.3 per cent. in 1890, 0.9 per cent. in 1880 and 0.2 per cent. in 1870.

The four States named above—Pennsylvania, Ohio, Illinois and Alabama—produced, as a whole, during the census year 1900, 24,847,243 tons of iron and steel, compared with 13,176,915 tons in 1890, 4,489,073 tons in 1880 and 2,070,891 tons in 1870. In 1900 their proportion of the total production of the country was 84.2 per cent., in 1890 it was 81 per cent., in 1880 it was 69.3 per cent., and in 1870 it was 63.5 per cent. They increased their aggregate production in 1900 over 1890 by 11,670,328 tons, or 88.6 per cent.; in 1890 over 1880 by 8,687,842 tons, or 193.5 per cent., and in 1880 over 1870 by 2,418,182 tons, or 116.8 per cent.

Comparison of Branches of the Iron Trade.

In 1900 over one-fourth of the aggregate capital reported was invested in the blast furnace industry, a little less than three-fourths in the rolling mill and steel works industry, and only one-tenth of 1 per cent. in the forge and bloomery industry. In 1890 the blast furnace industry reported about one-third of the aggregate capital invested, the rolling mill and steel works industry a little less than two-thirds, and the forge and bloomery industry a little over two-tenths of 1 per cent.

In active blast furnace establishments in 1900 the capital invested amounted to $148,226,113, against $134,608,543 similarly invested in 1890, and $89,531,362 in 1880. In idle blast furnace establishments the capital invested in 1900 was $9,981,445, compared with $6,458,865 similarly invested in 1890, and $14,394,883 in 1880. During each of the three census periods the amount of capital invested in building blast furnace enterprises exceeded $1,000,000, the figures being as follows: 1900, $1,026,475; 1890, $2,566,518; 1880, $1,224,931.

Referring to the rolling mills and steel works it is found that the aggregate capital invested in active establishments amounted in 1900 to $441,795,983, compared with $278,559,831 in 1890, and $116,458,390 in 1880, the amount reported in 1900 being almost four times the amount reported for 1880. The idle rolling mill establishments in 1900 represented an investment of $8,130,487, compared with $5,711,693 in 1890, and $4,064,355 in 1880. In establishments in course of construction the investment in 1900 amounted to $5,240,282, against $1,525,160 in 1890, and $902,000 in 1880.

The forge and bloomery industry is rapidly declining. From an aggregate investment of $4,395,963 in establishments of this character in 1880, the amount has fallen to $619,488 in 1900. In 1890 the amount invested was $1,074,970. Of the total for 1900 the active establishments reported had $508,388 invested, compared with $876,470 in 1890 and $3,915,213 in 1880. In 1900 the idle establishments reported capital to the amount of $111,100, against $198,500 in 1890 and $480,750 in 1880. Not one forge or bloomery producing bars or blooms for sale was in process of construction in the United States at the close of the census year, nor was any plant of this character erected in this country during the year named.

The number of active, idle and building iron and steel establishments in the United States in 1900 was 798, against 872 in 1890 and 1005 in 1880, a decrease in 20 years of 207. Beginning with blast furnaces, it is found that the number of establishments has diminished in 20 years from 490 in 1880 to 278 in 1900, a reduction of 212. It is also found that during the same period the number of establishments which owned or operated forges or bloomeries declined from 118 to 14, a loss of 104.

Taking up the rolling mill and steel works industry, however, a gain in the number of establishments for the 20 years is shown—namely, from 397 in 1880 to 440 in 1890, and to 506 in 1900, the gain during the 20 years being 109 establishments. It may be added that since the close of the census year a large number of new rolling mills and steel plants have been built, while the work of erecting additional plants is now being vigorously pushed. At the close of December, 1901, between 30 and 35 new plants were being equipped in the United States for the manufacture of pig iron and steel, or for rolling iron and steel.

Details of Production.

The production of pig iron in 1900, including spiegeleisen and ferromanganese and castings made direct from the blast furnace, as compared with 1890, showed an increase of 5,607,049 tons, or 63.4 per cent. In 1890 the increased production over 1880 was 5,469,273 tons, or 162 per cent. As compared with 1880 the increase in 1900 amounted to 11,076,322 tons, or 328 per cent. The total production of 1900 exceeded by 2,231,137 tons the combined production of 1890 and 1880.

The production of rolled and forged iron and steel and of direct steel castings by rolling mills and steel works in 1900 exceeded by 4,605,848 tons, or 44.1 per cent. of the combined production of both 1890 and 1880, the figures for 1900 being 15,040,129 tons, and for the combined periods 10,434,281 tons. As compared with 1890 the production in 1900 increased 7,651,885 tons, or 103.6 per cent., while as compared with 1880 the production in 1890 increased 4,342,207 tons, or 142.5 per cent. If the production of 1900 is compared with that of 1880 an increase of 11,994,091 tons, or 394 per cent., is shown for the 20 years.

The production of blooms and hammered bar iron for sale by forges and bloomeries shows a heavy decline in 1900, as compared with 1890 and 1880. In the ten years from 1890 to 1900 this decline amounted to 14,682 tons, or 47.3 per cent., and from 1880 to 1890 it amounted to 33,734 tons, or 52.1 per cent. In the 20 years from 1880 to 1900 the decrease amounted to 48,416 tons, or 74.7 per cent.

While the figures given above for pig iron and for castings produced direct from the blast furnaces are full and complete for the three periods named, and contain no duplications whatever, it should be explained that in reaching grand totals for the three branches of the iron and steel industry under review serious duplications are unavoidable, both in quantities and values. In the quantity and value of the steel castings reported, of the rolled and forged products manufactured and of the hammered blooms and bars made, there is always

a duplication of the quantity and value of the pig iron consumed in the manufacture of these products.

II.—The Manufacture of Pig Iron

The following table shows the details of this branch of the industry for 1900 as compared with 1890:

	1900.	1890.
Number of establishments	224	304
Capital	$148,226,113	$134,608,543
No. salaried officials, clerks, &c	1,763	1,068
Salaries	$2,308,420	$1,611,687
Wage earners, average number	39,358	33,415
Total wages	$18,500,462	$14,614,458
Miscellaneous expenses	$7,463,234	$6,342,675
Cost of materials used	$131,536,424	$110,098,615
Value of products	$206,823,202	$145,643,153
Tons of product	14,452,234	8,845,185

Quantities of Materials Used.

The materials used by this branch of the industry in 1900 were valued at $131,356,424, as follows: Domestic iron ore, 24,621,397 tons, value $61,800,805; foreign iron ore, including manganese ore, 754,383 tons, value $4,107,449; fluxing material, 7,326,706 tons, value $5,059,632; anthracite coal and culm, 886,564 tons, value $2,297,419; bituminous coal and slack, 832,235 tons, value $1,101,312; coke, 14,697,797 tons, value $38,976,776; charcoal, 31,421,585 bushels, value $1,846,201; mill cinder and scrap, 1,600,313 tons, value $3,772,385; all other material, value $12,574,451.

The foreign ores reported, which include considerable quantities of manganese ore, were obtained from Cuba, Spain, Italy (Island of Elba), Greece, Algeria, Russia, India, Japan, Turkey, Newfoundland, Canada, Brazil, Chile, Panama, Columbia, and perhaps one or two other countries. Cuba furnished by far the largest quantity in 1900 and 1890, about one-half of the quantity reported for 1900 coming from that country. Considerable quantities also came from Spain and Newfoundland in 1900. In 1890 almost all the foreign iron ore used came from Cuba. Large quantities of foreign manganese ores were consumed in Pittsburgh in 1900 in the manufacture of spiegeleisen and ferromanganese, and some even as far west as Chicago; aside from this very little foreign ore was consumed by blast furnaces west of the Alleghany Mountains. Manganese ores came chiefly from Russia, India, Japan, Brazil, Cuba, Panama and Chile. The consumption of foreign ore in 1900 was 219,467 tons less than in 1890. In 1880 the quantity consumed was not ascertained.

Character and Value of Pig Iron.

The pig iron produced in 1900 was divided as follows: Mixed anthracite coal and coke pig iron, 1,796,000 tons; coke and bituminous coal pig iron, 12,253,818 tons; charcoal pig iron, 303,567 tons; anthracite coal pig iron, 45,857 tons; mixed charcoal and coke pig iron, 52,992 tons.

Massachusetts reports the highest average price per ton for pig iron in 1900. Connecticut reports the next highest average price. No details can be given for these States for the year named, however, without disclosing the operations of their single pig iron producing establishments. The pig iron made in these States is produced exclusively with charcoal as fuel and is used for special purposes. Georgia reports the next highest average price per ton for 1900—namely, $17.96. Almost all of this iron was made with charcoal as fuel.

The average price reported by Pennsylvania in 1900, nearly all the iron being made with mineral fuel, was $14.98, as compared with $17.31 in 1890 and $26.08 in 1880. In Ohio the average price was a little higher than in Pennsylvania—namely, $15.75—but in 1890 it was lower. In 1880 the prices were almost the same.

The lowest average price for pig iron in 1900 was reported by Illinois, the average being $10.23. A large part of the pig iron made in this State is consumed by the makers in the manufacture of steel, which perhaps acounts for the low average price shown. Alabama reported the next lowest average, $11.21, and Tennessee the next, $12.54. The average price for the whole country was $14.29 in 1900, $16.46 in 1890 and $26.13 in 1880.

The total blast furnace production in the census year is classified by grades, as follows: Bessemer pig iron, 8,475,530 tons; basic, 937,439 tons; foundry, 3,514,743 tons; forge, 1,057,616 tons; white and motted and miscellaneous, 208,323 tons; ferrosilicon, 35,910 tons; spiegeleisen, 163,672 tons; ferromanganese, 51,878 tons; direct castings, 7123 tons.

Rank of the States as to Grades of Pig Iron.

Pennsylvania produced considerably more than one-half (54.5 per cent.) of the Bessemer pig iron made in the United States in the census year 1900, over two-thirds (71.1 per cent.) of the basic pig iron, almost one-fourth (24.4 per cent.) of the foundry iron, over two-fifths (42.2 per cent.) of the forge iron, about one-fourth (24.04 per cent.) of the white and mottled and miscellaneous grades, over one-fourth (28.4 per cent.) of the ferrosilicon, almost one-half (45.9 per cent.) of the spiegeleisen, practically all of the ferromanganese, and over three-fifths (61.1 per cent.) of the direct castings.

Ohio ranked second in the production of Bessemer pig iron (22 per cent.), second in the production of basic iron (10 per cent.), and second in the production of forge iron (23.3 per cent.), was first in the production of ferrosilicon (53 per cent.). Its rank as a producer of foundry iron, however, was third (8.7 per cent.), and it was also third as a manufacturer of white and mottled and miscellaneous grades (16 per cent.).

Illinois held third rank as a manufacturer of Bessemer pig iron (15.6 per cent.), and second rank (29.1 per cent.) as a manufacturer of spiegeleisen. It made all told only a little over 100,000 gross tons of foundry and forge iron.

Alabama, which produced no Bessemer pig iron at all, was first in rank as a manufacturer of foundry iron (25.1 per cent.), exceeding the production of this grade of iron in Pennsylvania by 26,736 tons. It ranked first in the production of white and mottled and miscellaneous grades (27.2 per cent.), third in the production of basic pig iron (9.6 per cent.), third in the production of forge iron (16.2 per cent.), and second in the production of direct castings (34.6 per cent.). No other State produced over 430,000 tons of pig iron in 1900.

Twelve States produced Bessemer and low prosphorus pig iron during the census year 1900; 8 States produced basic pig iron, 19 States produced foundry pig iron, all the active States except two (Colorado and West Virginia) reporting this grade; 15 States made forge or mill pig iron, 16 States made white and mottled and miscellaneous grades of pig iron, 3 States made ferrosilicon, 5 States made spiegeleisen, 2 States made ferromanganese and 6 States made castings direct from the furnace.

Decrease in the Number of Blast Furnaces.

While the production of pig iron increased heavily from 1880 to 1900, the number of blast furnaces decreased in the same period from 681 to 399, a loss of 282, or 41.4 per cent. This falling off was largely in New York, Pennsylvania and Ohio, these three States losing, all told, 209 furnaces (New York, 38; Pennsylvania, 121, and Ohio, 50). During the same period Virginia lost 5 furnaces. Tennessee 2, Maryland 15, Wisconsin 8, West Virginia 8, New Jersey 9, Michigan 14, Kentucky 16, Missouri 15, Georgia 5, North Carolina 5, Connecticut 3 and Massachusetts 3. Indiana, which had four furnaces in 1880 and two in 1890, had gone out of the pig iron business altogether, its furnaces being last active in 1893. So, too, has Maine, which reported one furnace in both 1880 and 1890, no pig iron having been made in the State since the year last named. Vermont, which reported one furnace, and Utah, which had two furnaces in 1880, have also given up the manufacture of pig iron, the furnace in Vermont having ceased work in 1882, and the two furnaces in Utah having gone out of blast finally in the same year.

As was explained in the report for 1890, many of the furnaces which were active in 1880 were abandoned or dismantled prior to 1890, owing to their inability to compete with the more modern, better located and larger furnaces of that year, the abandoned stacks being, as a rule, of small capacity, and capable of producing pig iron at a profit only during periods of high prices.

Increase in Output per Workman.

A word or two concerning the production of pig iron per wage earner employed in 1900 as compared with 1890

may be of interest. In 1900 the average number of wage earners employed at blast furnaces was 39,358, and the production of all kinds of pig iron was 14,452,234 tons, while in 1890 the number of wage earners was 33,415 and the production of pig iron 8,845,185 tons. Dividing the production of pig iron by the wage earners gives an output per wage earner in 1900 of 367.2 tons, and in 1890 of 264.7 tons, an increase per wage earner of 102.5 tons, or 38 per cent.

Taking up the manufacture of pig iron by fuels and adopting the same method as that employed above, it is found that the average production of mineral fuel pig iron per wage earner was 376.6 tons in 1900, as compared with 274.1 tons in 1890, an increase per wage earner of 102.5 tons. In the charcoal pig iron industry the average in 1900 was 187.04 tons per wage earner, as compared with 179.1 tons in 1890, an increase of only 7.9 tons. In the manufacture of mixed charcoal and coke pig the average production per wage earner in 1900 was 170.9 tons. As pig iron made with this fuel was not reported in the census of 1890, no comparisons with that year are possible.

III.—The Manufacture of Steel Ingots and Steel Castings and of Rolled Iron and Steel.

In the census reports for 1890 and 1880 the statistics of the production of rolled iron and rolled steel were separately reported. In the census of 1900, however, it was not found possible to continue this separation, and the rolled statistics for that year therefore cover the production of both iron and steel. The production of all kinds of steel ingots and direct steel castings was, however, ascertained for the period last named. Following are the details of this branch of the industry for the census year 1900 as compared with 1890:

	1900.	1890.
Number of establishments	438	395
Capital	$441,795,983	$278,559,831
No. salaried officials, clerks, &c.	7,442	3,242
Salaries	$9,421,868	$4,833,240
Wage earners, average number	183,023	137,295
Total wages	$102,238,692	$74,460,433
Miscellaneous expenses	$24,795,663	$11,817,593
Cost of materials used	$390,568,117	$216,669,022
Value of products	$596,689,284	$331,860,872
Tons of product	15,040,129	7,388,244

How the States Ranked.

Pennsylvania ranked first in the value of its cast steel and rolled iron and steel products during the periods covered by the table, the value of its output in 1900 amounting to 55.7 per cent. of the total value reported for the whole country, as compared with 56.9 per cent. in 1890 and 48.4 per cent. in 1880. In 1900 its products exceeded in value by $68,487,064 the combined value of all other iron and steel manufacturing States, as compared with a similar excess in 1890 of $45,567,508. In 1880, however, the value of the products of all iron and steel manufacturing States exceeded the value reported by Pennsylvania by $6,382,624. While many of the rolling mills and steel works of this State are located east of the Alleghany Mountains, some being equipped with the latest improved machinery and appliances and employing thousands of workmen, the majority of its large and modern establishments are to be found west of the mountains named, and especially in Allegheny County, which in 1900 reported 60 establishments for the manufacture of steel ingots or castings or rolled iron or steel. These establishments gave employment to 41,586 wage earners, whose earnings amounted to $25,082,973, and they turned out finished iron and steel products to the value of $182,696,424, or within $2,195,658 of the combined production of four leading States outside of Pennsylvania—namely, Ohio, Illinois, New Jersey and Indiana.

Ohio ranked second in 1900 in the value of its cast steel and rolled iron and steel products, its increase in that year amounting to $53,162,059, or 117.1 per cent., over 1890, and $76,688,452, or 350.5 per cent., over 1880. Illinois ranked third, having increased the value of its products in 1900 over 1890 by $16,276,757, or 56.4 per cent., and over 1880 by $26,996,059, or 148.7 per cent. New Jersey ranked fourth, the increased value of its products in 1900 over 1890 amounting to $13,079,053, or 149.4 per cent., and over 1880 to $15,131,430, or 225.7 per cent. Indiana ranked fifth, the value of its products having increased in 1900 over 1890 by $14,832,945, or 329.2 per cent., and over 1880 by $15,247,613, or 372.7 per cent. Massachusetts was sixth in rank, West Virginia seventh, New York eighth, Wisconsin ninth, and Maryland tenth, the value of the products in the State last named amounting to $5,540,179. With the single exception of Kentucky, no other State produced in 1900 over $5,000,000 worth of steel castings or hot rolled iron or steel products.

In 1900 there were 505 active, idle and building rolling mill and steel making establishments, of which 438 were active, 38 were idle and 29 were in the course of construction. Of the total completed establishments 42 were equipped for the manufacture of Bessemer steel, 94 for the manufacture of open hearth steel, 40 for the manufacture of steel by miscellaneous processes. The Bessemer establishments contained 91 converters, the open hearth establishments 330 furnaces (151 acid and 179 basic), and the crucible establishments 2619 pots that could be used at a heat.

Details of Materials Used.

The following table shows the quantity and cost of the principal materials used by rolling mills and steel works in 1900:

	Tons.	Cost.
Iron ore	340,028	$1,326,395
Pig iron, spiegeleisen and ferromanganese	10,410,281	151,042,348
Old iron or steel rails, and other scrap iron and steel	4,113,287	66,670,855
Hammered iron ore, blooms, pig or scrap blooms and imported Swedish billets and bars	32,720	1,150,575
Muck or scrap bar purchased	161,329	4,535,939
Iron or steel ingots, blooms, billets, tin plate bars, sheet bars or slabs purchased (except imported Swedish billets and bars)	3,682,407	92,123,412
Wire rods purchased	136,725	5,419,617
Anthracite coal and culm	944,018	1,220,694
Bituminous coal and slack	10,944,046	14,679,804
Coke	827,246	2,014,390
Charcoal, bushels	2,250,022	170,345
Natural gas	.....	3,098,409
Oil used for fuel, barrels	1,302,615	1,158,748
All other materials	.....	45,956,586

The consumption of pig iron, spiegeleisen and ferromanganese shows an increase of 4,563,375 tons as compared with 1890, or 78 per cent., and of 8,048,977 tons as compared with 1880, or 34.9 per cent. Old iron and steel rails and other scrap iron and steel show a large increase in consumption in 1900 as compared with 1890 and 1880, the increase over the former year amounting to 2,387,125 tons and over the latter year to 2,914,445 tons. Purchased hammered iron ore blooms, pig iron and scrap blooms, imported Swedish billets and bars and muck or scrap bars all show a decrease in consumption in 1900 as compared with 1890. On the other hand, the consumption of purchased ingots, blooms, billets, tin plate bars, sheet bars and slabs shows a very great increase as compared with both 1890 and 1880, this increase as compared with 1880 amounting to 3,613,525 tons. The consumption of purchased wire rods was not separately reported in 1890 or 1880.

Details of Products.

The following table shows the quantity and value of the leading products reported by rolling mills and steel works in 1900 and 1890:

	1900.		1890.	
	Tons.	Value.	Tons.	Value.
Rails: Iron	880	$31,180	13,715	$622,224
Steel	2,250,457	46,501,979	1,853,862	60,272,575
Iron and steel bars and rods (not including sheet or tin bars or wire rods)	2,493,159	100,597,221	1,527,347	68,567,415
Iron and steel wire rods	916,587	35,529,529	(a)	(a)
Structural shapes: Iron	27,091	1,051,556	122,792	6,941,474
Bessemer	263,800	8,381,717	85,440	4,529,411
Open hearth	566,092	19,928,249	68,128	3,992,074

Iron and steel hoops, bands, cotton ties and skelp	1,195,189	49,159,747	546,203	23,628,849
Iron and steel rolled car axles	56,339	2,757,051	2,232	127,500
Iron and steel hammered car axles	46,267	1,725,886	52,184	2,935,451
Iron and steel muck and scrap bar produced for sale	203,681	5,940,587	252,089	7,411,748
Iron and steel boiler and other plates and sheets (except nail and tack plate, black plates or sheets for tinning, and armor plate)	1,488,066	68,109,223	652,693	39,359,094
Iron and steel nail plate	81,101	2,466,340	(a)	(a)
Iron and steel tank plate	16,563	650,218	(a)	(a)
Bessemer black plates or sheets for tinning	355,077	18,673,312	(a)	(a)
Open hearth.	38,937	2,294,494	(a)	(a)
Iron and steel armor plate and gun forgings	15,302	7,526,479	(a)	(a)
Iron and steel rolled blooms, slabs, billets, tin plate bars and sheet bars produced for sale	4,172,286	96,321,887	(a)	(a)
Ingots produced for sale	103,707	2,781,145	(a)	(a)
Direct steel castings	177,156	14,609,893	(a)	(a)
All other products	.....	111,651,591	.....	113,473,057
Totals	.....	$596,689,284	.....	$331,860,872

(a) Not reported separately.

Analysis of Production.

It will be seen from these details that the manufacture of iron rails in the United States had almost entirely ceased in 1900. The few tons made were chiefly for use in mines and were of light weight. The average price of iron rails in 1900 was $35.43 per ton; in 1890 it was $45.36 per ton and in 1880 it was $50.32 per ton. The production of steel rails in 1900 shows an increase of 396,595 tons over 1890, or 21.4 per cent., and of 1,580,296 tons over 1880, or 235.8 per cent. The average price of steel rails in 1900 was $20.66 per ton, as compared with $32.51 per ton in 1890 and $56.54 per ton in 1880.

The increasing use of iron and steel in late years in the construction of large office buildings, bridges, steel cars, &c., is forcibly shown by comparing the production of structural shapes in 1900 with 1890 and 1880. In 1900 the total production of iron, Bessemer steel and open hearth steel material for structural purposes was 856,983 tons, against 276,355 tons in 1890, an increase of 580,628 tons, or 210.1 per cent., and 87,006 tons in 1880, an increase of 769,977 tons, or 885 per cent. Steel has largely supplanted iron for work of this character since 1880, when almost all the structural materials reported were made of iron. The falling off in 1900 in the production of iron structural shapes as compared with 1890 amounted to 95,701 tons, or 77.9 per cent., and as compared with 1880 to 59,347 tons, or 68.7 per cent., the figures for 1890 showing a growth as compared with 1880. Bessemer structural shapes show an increase in 1900 as compared with 1890 of 178,360 tons, or 208.8 per cent., and as compared with 1880 of 263,303 tons. Open hearth structural shapes increased in 1900 over 1890 by 497,969 tons, or 731 per cent., and over 1880 by 566,021 tons.

The average value per ton of iron structural shapes in 1900 was $38.82, as compared with $56.53 in 1890 and $63.87 in 1880; of Bessemer steel structural shapes $31.77 in 1900, $53.01 in 1890 and $126.88 in 1880; and of open hearth structural shapes $35.19 in 1900, $58.60 in 1890 and $123.94 in 1880. For all kinds of structural shapes (including iron and Bessemer and open hearth steel) the average value in 1900 was $34.26 per ton, against $55.95 in 1890 and $64.28 in 1880.

In 1900 the iron structural shapes were produced in Pennsylvania, California and New Jersey, in the order named; the Bessemer steel shapes in Pennsylvania, Ohio, New York, Colorado and Illinois in the order named; and the open hearth shapes in Pennsylvania and New Jersey. Pennsylvania's production of all kinds of structural shapes in 1900 amounted to 766,995 tons, of which 15,445 tons were iron, 225,458 tons were Bessemer steel and 526,092 tons were open hearth steel. New Jersey produced 45,300 tons of iron and open hearth shapes. No other State reported a production of 35,000 tons. Pennsylvania produced 57.01 per cent. of all the iron shapes, 85.47 per cent. of the Bessemer steel shapes and 92.93 per cent. of the open hearth steel shapes reported for 1900. Its percentage of the grand total was 89.5. Almost all the open hearth shapes reported by this State in 1900 were made of basic steel.

IV. The Manufacture of Iron Blooms and Hammered Bar Iron for Sale.

The statistics here given relate only to the manufacture for sale of hammered charcoal blooms, billets and bar iron direct from iron ore and of hammered charcoal blooms, billets and bars from pig iron and from scrap iron and steel. The production of establishments which consume in their own works the charcoal blooms or bars made is not included in any of the tables. The products of a "forge" are hammered blooms and bars made direct from iron ore; the products of a "bloomery" are hammered blooms, bars, &c., made from pig iron and scrap iron and steel.

The following table shows the details for the forge and bloomery industry for the census years 1900 and 1890:

	1900.	1890.
Number of establishments	7	20
Capital	$508,388	$876,470
Salaried officials, clerks, &c., number	12	15
Salaries	$11,500	$17,309
Wage earners, average number	226	471
Total wages	$97,184	$199,065
Miscellaneous expenses	$15,203	$54,680
Cost of materials used	$327,160	$905,208
Value of products	$522,432	$1,183,494
Tons of product	15,497	31,049

As shown by this table, the forge and bloomery industry is fast passing away. As compared with 1880 the decline was even more marked, the decrease in the number of establishments amounting to 88, in capital to $3,406,825, in wage earners to 2713, in wages to $818,211, in the cost of materials to $21,219,755, in the value of products to $3,445,642 and in output to 49,286 tons. Twenty years ago the pig iron used amounted to 34,029 tons and the scrap iron and steel to 7976 tons. In 1890 the pig iron consumed fell to 7346 tons and the scrap iron and steel increased to 21,429 tons. In 1900 the pig iron used amounted to only 1000 tons, while the scrap iron and steel amounted to 13,693 tons.

The production of wrought iron from ore declined from 33,601 tons in 1880 to 8346 tons in 1890 and 3142 tons in 1900, and the production of blooms from pig and scrap iron from 31,182 tons in 1880 to 22,704 tons in 1890 and to 12,355 tons in 1900. The decline in the production of both products was from 64,783 tons in 1880 to 31,049 tons in 1890 and to 15,497 tons in 1900.

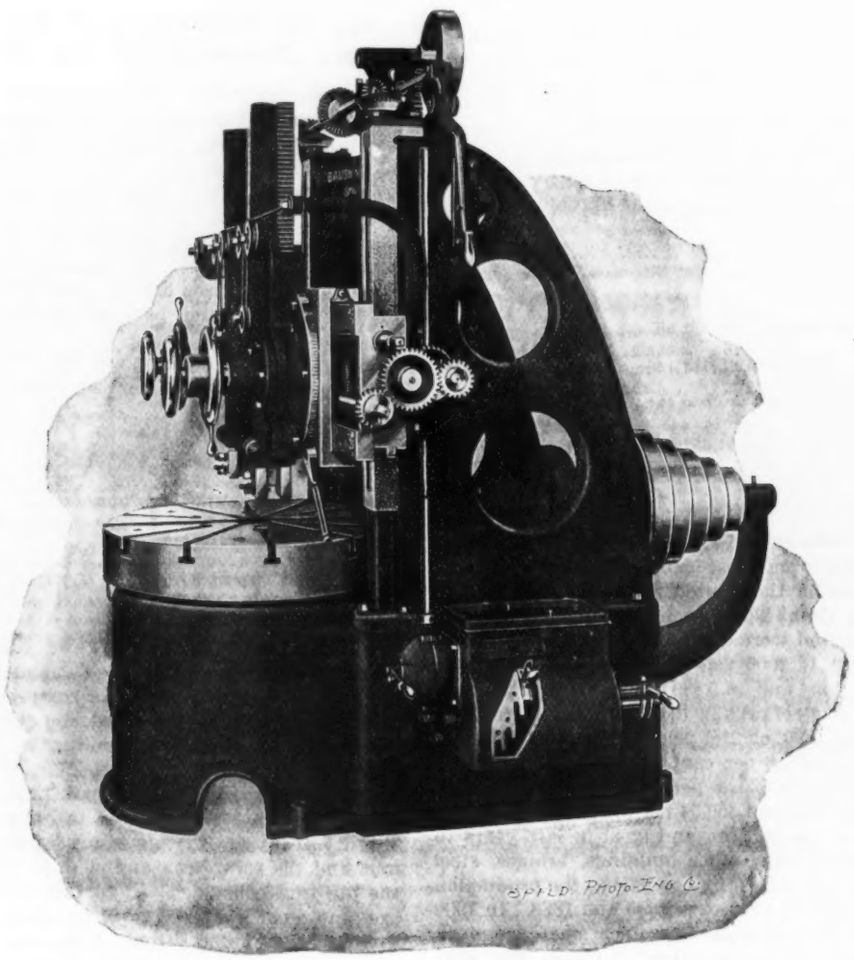
The average value of the blooms and bars made direct from the ore in 1900 was $35.41 per ton, as compared with $42.76 per ton in 1890 and $53.94 per ton in 1880. The blooms, billets, &c., made from pig iron and from scrap iron and steel averaged $32.63 per ton in 1900, as compared with $36.17 per ton in 1890 and $68.31 per ton in 1880.

Ahmed Pasha, Chief Constructor of the Turkish Navy, after a survey of the shipbuilding companies of this country early in 1900, contracted, on behalf of the Sultan, in December, with the Cramp Shipbuilding Company of Philadelphia, for the construction of a protected cruiser. The vessel is of the fast cruiser type, of 22 knots speed. It is armed with rapid firing guns and is now nearly ready for launching.

The Baush Boring and Turning Mill.

The new boring and turning mill designed by the Baush Machine Tool Company of Springfield, Mass., has independent feeds for each head, which are operated by the Hendey-Norton device. There are 15 changes ranging from 1-64 to 9-16 inch vertical, and from 1-64 to ⅞ inch horizontal for each revolution of the table. The change from one to the other can be made almost instantly and without stopping the mill.

The heads can be operated independently of each other and by means of a split nut, and a rack and pinion can be moved back and forth very quickly, which is a decided advantage in setting up for different classes of work. The back gears are located and arranged so that they can be thrown in and out by a lever without the use of a lock nut. The cross rails are raised and lowered by power, the pulley being placed in the center; it is actuated by a lever, thereby doing away with the belt from the countershaft.



THE BAUSH BORING AND TURNING MILL.

The table can be removed and replaced by an independent, or an independent and universal chuck. It has an outer bearing with a self oiling device which keeps it constantly and well lubricated. The main bearing is large and long, and its formed with a hole through the center to permit the chips to pass through. The design is such that the cone and bearing can be removed and a motor substituted.

The Manufacture of Oxygen.—The Gesellschaft fuer Lindes Eismaschinen has recently built an experimental plant at Hoelriegels greuth, near Munich, Germany, for the manufacture of oxygen, or rather, a gas mixture richer in oxygen than air. The underlying principles and the apparatus have been described in a paper read by C. Linde, the well-known expert in machinery, before the Verein Deutscher Ingenieure. The manufacture is based upon the fact that oxygen boils at a temperature of 1825 degrees Celsius below zero, while the boiling point of nitrogen is — 195.5 degrees. Linde reports that with a consumption of 100 horse-power it is possible to make 100 cubic meters per hour of a mixture containing equal volumes of oxygen and nitrogen, so that the ballast of nitrogen is reduced from 3.8 to 1 part. He figures that the efficiency of the apparatus is about 50 per cent. We understand that Pictet has been doing a good deal of work in the same direction, and that Galloway's of Manchester, England, have put up one of his plants.

The Hoerde Semi-Centennial.

The completion of 50 years of existence as a stock company of the Hoerde Bergwerks und Huetten Verein of Hoerde, Germany, has been the occasion of a handsome souvenir volume which records the history of the concern. Originally a puddle mill largely dependent upon English pigiron, the idea was broached to utilize black band ore deposits discovered in the vicinity, and the Hoerde Company were organized in 1852 to take over the mill, to build six blast furnaces and acquire collieries and iron mines. The furnaces made about 20 tons per day, but the black band was gradually exhausted. In 1863 Hoerde took out a Bessemer license, the second in Germany. In 1868 the plant reached an output of 5000 tons. In 1869 a plant of three 6-ton converters was erected, which would carry the capacity up to 20,000 tons of ingots per year. In 1879 the managers of the company bought jointly with the Rheinische Stahlwerke the Thomas patents. The interesting statement is made that the net profit accruing to the company on royalties aggregated 3,414,105 marks, or about $850,000. The progressive management of the concern was again shown in 1890 by putting up the first pig iron mixer in Europe, purchasing the patents for Europe and more re-

cently, in 1896, by putting up the first three 600 horsepower engines driven by blast furnace gas. The company went through a number of vicissitudes financially.

Pacific Coast News.

SAN FRANCISCO, CAL., August 18, 1902.—Fall business is opening up with a good deal of activity, although it has not as yet fully developed. Harvesting is about over, but matters have not as yet settled down to the lines of what may be termed regular fall trade. As to produce, wheat, barley and cereals in general, prices may be termed good, wheat being on an average $3 per ton higher than it was a year ago. On the other hand, with an immense fruit crop, prices are lower than they were last year. Again, lumber, both redwood and sugar pine, are higher, the former 40 per cent. higher than a year ago. And the price of oil is improving, so that there will be a great deal more money in the hands of purchasers than there has been in a decade. The number of houses and improvements being put up in city and country is unprecedented, and despite higher prices of labor and material, which are advancing every day. The clearing house exchanges fairly reflect all this, although the percentage is not as far above 1901 as it was earlier in the year. But movement of produce has not been as active as it was at this time a year ago. When wheat begins to go out briskly and fruit, canned and dried, begins to move rapidly, business will be more lively in the country towns and as a consequence in the city. There are more or less complaints of the high prices of everything, and some go so far as to say that they have interfered with building, &c. But as yet we have not been able to see it.

There never has been a year when the imports of all classes of iron, steel, hardware, &c., have been as great as they have been for the past year, but as the railroad managers do not give out figures for publication any longer we cannot give them in a concrete form. They are certainly much larger than they were a year ago—10 per cent. at least. We have had considerable imports of pig iron by sea from England since the first of the year, about 8000 tons to date. Of tin plate there has been comparatively little—in fact, less than in any year since we began to import it from abroad, not quite 30,000 boxes in all. We have, however, imported very largely of pig tin, principally straits, Australian for some reason or other cutting but a small figure in our markets. The imports of bar and bundle iron, pipe, machinery, nails, hardware, &c., via Panama, have been very large for the first half of the year, although, of course, the most of the general supplies and all rush orders come by rail.

The trade discriminate, and where time is not an object and where the rail rate is for any reason too high compared with the water rate the latter gets the preference. The imports of certain descriptions of hardware are sometimes very large by steamer. Thus the "Acapulco," which came in during the past fortnight, had 2488 cases specified as such, besides what was among the unspecified merchandise on her manifest. During the past few weeks, however, imports by rail or steamer have not been as large as they had been. San Francisco used to be very important as an entry port for metals and their manufactures, but the developments of the past ten years in the manufacturing world of the East have, as a rule, shut out almost everything in that line—pig iron, bar and bundle iron and tin plate particularly. And when railroad freights become low enough or we start to utilize our own iron resources, imports from foreign countries will practically disappear.

The export trade continues to be fairly active, but not as large as in the months of June and July comparatively. The "Curacoa" for Mexico had machinery valued at $4040, the "Irngard" for Honolulu pipe valued at $1220, the "Coptic" machinery to China valued at $2370, and to Japan at $9303, with bicycles to the latter destination valued at $2826. The "St. Katharine" for Hilo had machinery valued at $454, and bicycles valued at $125; the "Sierra" had bicycles valued at $1736, principally for New Zealand, with machinery valued at $2088 for Australia and $4428 for New Zealand. The "America Maru" had machinery valued at $9290, of which $6000 was electrical for Japan and $1810 for other places. Besides these there was a good deal of hardware and many other articles, tools, &c.

The first cargo of California oil that ever cleared from this port for any destination was that of the "Fullerton," which cleared on the 18th for Kahalui in the Hawaiian Islands with 630,000 gallons of petroleum valued at $15,000. J. O. L.

German Export Allowance.

Under date of July 16 the German wire rod syndicate announces that an accounting office for experts has been opened at Duesseldorf, to which all demands for export allowances must be addressed. The operations of the accounting office are retroactive to April 1. The circular states: Generally speaking, the principle rules that an export allowance is granted only when coal and all raw materials are purchased from the Rhenish-Arstphelian coal syndicate, the pig iron syndicate and the billet syndicate and wire rods only from the wire rod association. A further principle is that the manufacturing branch which furnishes the export goods needs help in order to maintain and develop its export and can prove this necessity. So far as purchases of raw materials are concerned, the allowance for the same is only made by one syndicate to the other. Accordingly purchasers of wire rods would have a claim on the export goods, but the buyers of drawn wire would not do so on export goods made therefrom, because they buy the wire in the open market and the accounting office holds that in closing the contract the export allowance has already been granted in the price, and that certainly there is no means of judging, so far as the selling price is concerned, whether prices as low were necessary for the particular branch of industry. The allowance is not generally granted by the syndicates, the accounting office reserving the right, dating back to April 1 ,to determine for each individual case whether the claim for an export allowance should be granted or denied. There must, therefore, be attached to each individual claim copies of the cost figures and the accounting office reserves the right to have one of its officials inspect all the books and correspondence of the party making the claim for the export allowance. The application must be made on blanks furnished by the accounting office, and must include consecutive number of the copy of cost account appended, page of cost account copying book, page of sales book and date of sale, name of customer and country to which goods are exported, character of goods, net weight in kilograms and net base price profit per ton secured. The calculation of the latter must be carried out on the blank. Allowance is made only on net weight. If the gross weight only can be determined then a deduction must be made for packing, galvanizing, &c.

Accounts are rendered quarterly, but are not bound to any particular time. As a rule they will be made 30 days after the receipt of the applications for the accounting quarter.

In order to pay for the cost of administering the accounting office will deduct 1 per cent. from the allowances made. Differences of opinion and disagreements as to the allowances for export and the rates are settled by the decision of the board of the accounting office, or by the presiding officer; a suit at law cannot be taken.

Such are the principal provisions of the latest manifesto which has created some stir in German trade circles. A writer in a newspaper at Haken protests vigorously against such methods which place the business results of a concern at the mercy of officials and suggests that the time may come when humble appeal must be made to the syndicate to decide what trousers one is to wear, how often one is to be allowed to eat meat and how many glasses of beer one may drink.

The Nova Scotia Steel Company, of which John F. Stairs of Montreal is president, have decided to erect a new steel plant.

Central Pennsylvania Industrial News.

HARRISBURG, PA., August 26, 1902.—Managers of Central Pennsylvania works are on a hunt for iron and steel which is every bit as keen as that for fuel. Many tons of foreign pig iron, especially English and Scotch brands, and of German, English and Belgian steel, have been bought for works in this part of the State within the last month, and receipts for the last fortnight have been astonishingly large, when one considers how little foreign material has been imported into this section within the last decade. Several heads of works have gone abroad to make purchases in person, while others have commissioned agents to buy in quantities which indicate that there will be lots of steel and iron needed to fill contracts required before the first of the coming year.

Furnaces are being blown out or banked in every valley. In some instances the period of banking lasts only a short time, three or four days, but this has become so frequent that several companies have blown out their stacks, preferring idleness, with its chances for making repairs or improvements and filling up bins, to intermittent operation. The lower Susquehanna furnaces, especially in Dauphin County, have been running pretty steadily, owing to their favorable location on the main line for receiving supplies from the soft coal and coke regions, but there have been some bankings. Lebanon furnaces keep going fairly well, but Sheridan continues idle, while Keystone at Reading and the Empire's Topton, Macungie and Reading stacks have stopped. Over half of the Reading furnaces are idle and Warwick, Robesonia and other well-known stacks can barely keep going regularly. In the Lehigh Valley affairs are much the same, the Bethlehem and Crane stacks being in about the best shape. Several of the Thomas stacks are idle, and a number of the smaller ones are undergoing repairs. In Harrisburg one Paxton and Lochiel will start soon if affairs improve, but that city is more or less affected by the strike.

The Harrisburg Bridge Company are having plans drawn for a bridge to replace the old Susquehanna bridge, which was destroyed by flood in March. The new bridge will cost between $200,000 and $300,000. Bids will be invited before very long.

The Harrisburg Mfg. & Boiler Company have elected the following officers and directors: President, J. A. Affleck; vice-president, S. F. Dunkle; secretary, George W. Reily, and treasurer, H. J. Forney; directors: Edward Bailey, E. W. S. Parthemore, C. C. Forney, F. A. Awl and Morris Manderbach and the officers. The company declared a 6 per cent. dividend and decided to create a fund to build an electric plant at the Naudain street works and for general improvements.

The Newport Foundry & Mfg. Company have decided to rebuild the plant recently burned. It is to be erected at once.

The Pennsylvania Steel Company have started more new branches in the new buildings of the frog, switch and signal departments, and will occupy the entire addition soon. New engines are also being built at the new power plant and at No. 1 blooming mill. The company now take their water supply from a new pump house and reservoir located along the Susquehanna. Over 100 names have been added to the rolls almost every week this summer. The product is not up to the average, owing to the scarcity of iron and fuel.

The Frick Company at Waynesboro have taken the contract for the ice machine for the new women's hotel in Manhattan and the Shoreham in Washington, through the Dubois Mfg. Company. A 13-ton machine will be built for the new Piedmont Hotel in Atlanta.

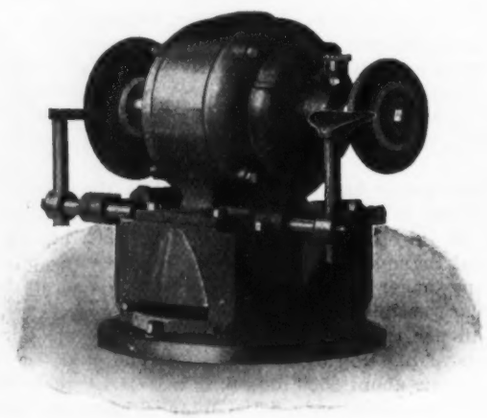
Frank Rosensteel, who bought the Morrellville foundry last week, will improve it. He paid George Gore $25,000 for it.

The starting of another furnace in Bellefonte has given a brighter hue to the conditions in Center County, where affairs have not been as lively as many would have liked them. The iron industries are all running nowadays.

Aside from the trouble over fuel in the Lehigh Valley there are lively times. The Bethlehem Steel Company are pushing along improvements, and only a short time ago blew in a furnace which had been idle for years. The Sterlingworth Railway Supply Company and Ingersoll-Sergeant Drill Company at Easton are contemplating enlargements, the former having decided to build a large addition. The Allentown Hardware Works will also employ more hands soon. S.

The Little Badger Electrically Driven Grinder.

The grinder here illustrated is essentially a bench tool, being small enough to be placed anywhere on the tool bench. The base is heavy enough to keep it in position even if not bolted down, although provision is made for fastening it if desired. The motor is placed between the wheels which are carried by the armature shaft. It is mounted on a swivel base, which allows it to be swung a quarter turn in either direction. This is a desirable feature in that it enables the workman to often obtain a better light on his work and facilitates the grinding of irregular and large pieces. The motors are inclosed, preventing dust, dirt or grit from damaging the commutator, armature or bearings. The tool rests are adjustable, so that either the face or side of the wheel may be used. The bearings are provided with lubricating devices which will last for a long time, and



THE LITTLE BADGER ELECTRICALLY DRIVEN GRINDER.

when finally worn out can be quickly replaced. An automatic cut off switch is placed inside the stand. The machine occupies a space 13 7-16 x 18 inches, and is 14 inches high. It is manufactured by the Northern Electrical Mfg. Company of Madison, Wis., the exclusive sales agents being the Mechanical Appliance Company of Milwaukee.

The important offices of secretary and treasurer of the Schonthal Iron & Steel Company, Cumberland, Md., are at present filled by probably the youngest man holding such a position in this country. This official is Bela E. Schonthal, who is only 19 years of age, but has been serving in the capacity of secretary and treasurer since the organization of the company some two years since. The company are manufacturers of light steel rails, and are operating the old Baltimore & Ohio rolling mill. Mr. Schonthal buys all the materials and sells the product of the plant. He is the son of Joseph Schonthal of Columbus, Ohio, who conducts an extensive business in iron and steel scrap and is also president and chief owner of the Schonthal Iron & Steel Company.

We are advised by C. B. Carter, Knoxville, Tenn., secretary-treasurer of the Southern Supply and Machinery Dealers' Association, that the next meeting is to be held at Memphis on October 21, 22 and 23. The headquarters will be at the New Gayoso Hotel, manufacturers being cordially invited to participate in the meeting.

A Report on Boiler Rivets.

The Montreal Boiler Insurance Company of Boston, of which Edward Atkinson is president, have issued the following report on boiler rivets: "In well designed joints of boilers the rivets have an excess of strength; and if a boilermaker succeeds in getting the rivets well driven they give thereafter but little trouble. It is, therefore, not so important to look after the quality of boiler rivets as it is to look after the quality of the plates. At the same time it is desirable to have all parts of a boiler of a good quality of material.

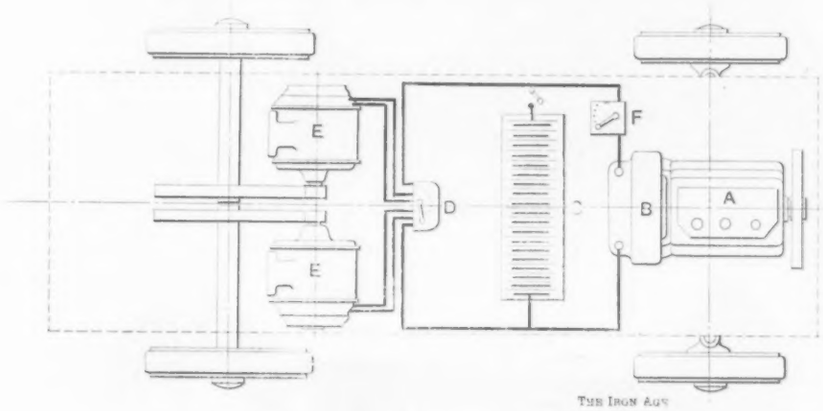
"Our specifications call for the following: Rivets to be of good charcoal iron, or a soft mild steel, with not more than 0.04 per cent. of sulphur and phosphorus. They may be tested cold by driving down on an anvil with head in a die, by nicking and bending and by bending back on themselves without developing serious cracks or grooves.

"That it is necessary to make tests and inspections in order to get a good quality is shown by some recent experience: We found on making the nicking and bending test that the rivets broke from one-half to nine-tenths through instead of breaking less than a quarter, as should a first-class rivet. The chemical test showed the phosphorus to be 0.375 per cent., or ten times what it should be. Led on by these tests we have recently tested several lots of rivets at different boilermakers. The steel rivets of the best known brands have, on the whole, stood up well, but the iron rivets have not, and at least one brand of steel rivets proved very poor. The rivets of the latter brand broke with one blow of the hammer after nicking, showing very brittle material."

An English Raw Hide Plant.—A. Tait, assistant manager of the works of George Angus & Co., Limited, New Castle-on-Tyne, England, one of the largest leather manufacturers of the United Kingdom, recently spent two weeks in Syracuse, N. Y., having come to this country especially to visit the works of the New Process Raw Hide Company. An arrangement was made with Angus & Co. by T. W. Meachem, president of the New Process Raw Hide Company, during a recent trip abroad whereby the English concern are to establish a plant in England for the manufacture of raw hide gears and other products under the patents and secret processes of the New Process Raw Hide Company and using the latter company's trade-mark. This plant, it is expected, will take care of the company's business, not only in Great Britain, but throughout Europe, Angus & Co., having offices in nearly all of the principal cities, and therefore being excellently situated to care for this trade. Upon Mr. Tait's return to England he will place orders with American firms for the latest gear making machinery, and will proceed at once with the fitting out of the new factory, which will be located at New Castle-on-Tyne, England. Angus & Co. have been the agents of the New Process Raw Hide Company in Great Britain for eight years, and have a well established trade in New Process pinions.

The Fischer Motor Vehicle Combination System.

That there is a demand for heavy motor vehicles there can be no doubt, for in these days of keen competition anything that will show a saving in cost of operating as compared with horses and at the same time relieve the congested condition of our busy streets will be welcomed by the progressive business man. But it is necessary to have a vehicle that is absolutely reliable, easily handled and economical. The problem of power, apparently solved in light pleasure vehicles, is found to be much more difficult to meet in heavy ones. Each power system has its advantages and disadvantages. The gasoline engine, for instance, is a very good and most convenient power producer when operated under favorable conditions, but its economical range of speed is very limited and it will not, even for a few seconds, pull an overload; therefore, when applied to intermittent and variable speed work like an automobile the control and transmission become complicated and troublesome. In the electric, on the other hand, conditions are directly opposite; the control is practically perfect and, as far as the motors are concerned, application direct and efficiency high, but when dependent on storage battery it is only a secondary power and therefore the mileage is limited.



A, Engine; B, Dynamo; C, Battery; D, Controller; E, Motors; F, Engine Starting Switch.

Fig. 1.—Diagram Showing General Arrangement.

THE FISCHER MOTOR VEHICLE.

Realizing the above, the Fischer Motor Vehicle Company of Hoboken, N. J., have for the past five years been perfecting a combination system. This system possesses the advantages of the electric and gasoline combined, while the disadvantages inherent to each alone are practically eliminated by the combination.

Fig. 1 is a diagram illustrating the system, which consists of a combined gasoline engine and dynamo, one motor for each rear drive wheel and a small storage battery and controller. It will be noticed that there is no mechanical connection between the engine shaft and vehicle drive wheels, therefore the dynamo is free to run at a practically even speed, producing a constant supply of electricity. The electric circuit is so arranged that when running the vehicle under normal conditions, loaded on the level, the current goes directly from the dynamo through the controller to the motors, but when coasting down grade, slowing up or in general when less power is needed than that furnished by the engine, the current is automatically taken up by the battery, which is connected to the wiring at a point between the dynamo and controller. Again, when extra power

is needed, as in ascending steep grades or starting heavy loads, the battery promptly furnishes the deficiency. This action, carrying the peak of the load, does not have to be watched by the operator, being entirely automatic. As the output of the engine does not vary no governor is required, and the gas and air mixtures can be set permanently for perfect combustion. This insures saving in fuel and prevents the usual bad odor.

As the speed of the engine is almost constant the balance will be practically perfect, preventing vibrations. Another important and convenient feature is the starting of the engine, which is accomplished by simply throwing in a switch controlled by the driver.

The running gear of the wagon consists of an angle steel under-frame to which various parts of the machine are attached. The front portion, Fig. 2, carries the gasoline engine, dynamo, controller and steering gear. The front axle, instead of the usual heavy forging, is trussed somewhat on the principle of a bridge and carries extra long and flexible platform springs, bolted to the brackets on the frame. The rear axle, different views of which are presented in Figs. 3, 4 and 5, with the wheels, springs, two motors and reduction gears forms a complete driving unit. All parts subject to wear are entirely incased so as to be properly lubricated and at the same time protected against dust and moisture. No reach is used, the half elliptic springs conveying the power from the rear axle to the frame. The water cooler is suspended under the frame between the front and rear axles.

The power equipment consists of a 10 horse-power three-cylinder, four-cycle gasoline engine, running 600 revolutions per minute. All wearing parts are extra large, provision is made for taking up wear and lubrication is entirely automatic. Directly on the engine shaft is placed the armature of a 5 kw. 110-volt dynamo. The

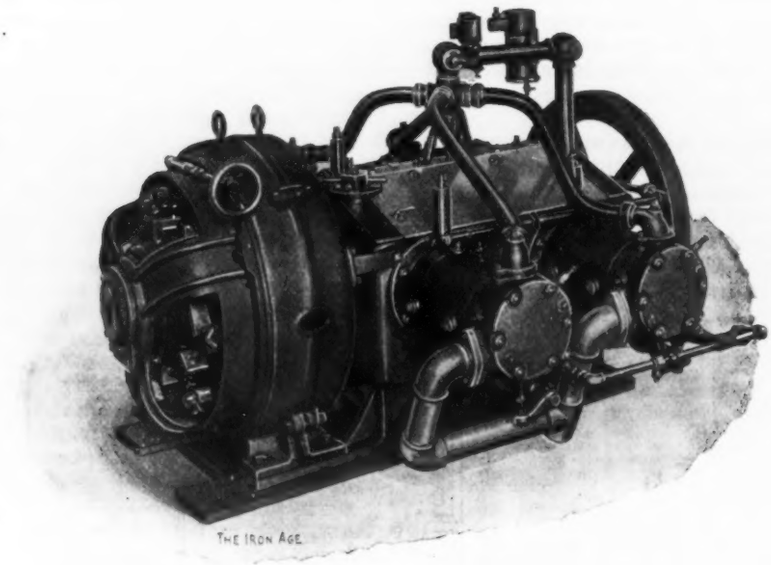


Fig. 2.—Engine and Dynamo Complete.

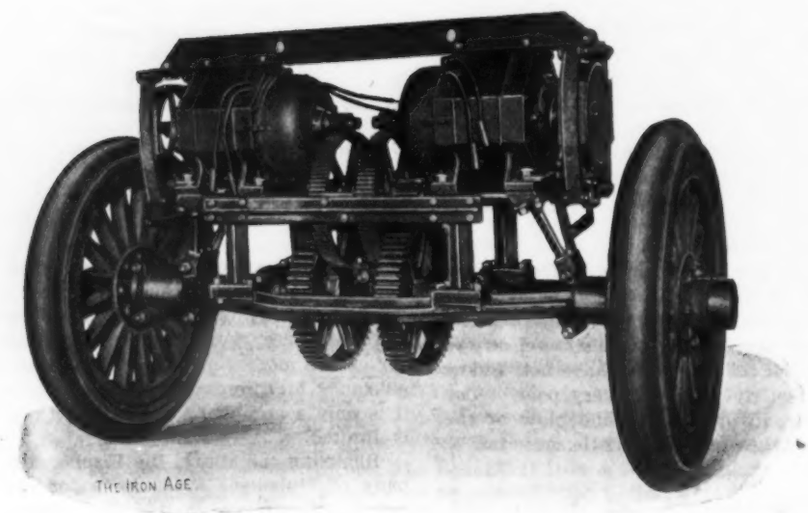


Fig. 3.—View of Rear Axle.

THE FISCHER MOTOR VEHICLE.

motors are of a special "twin" type (built together), 5 horse-power each, and will stand an over load of 100 per cent. for a half hour or 200 per cent. for 5 minutes without sparking at the brushes. The controller is of the series parallel type of five forward speeds from 2½ to 10 miles per hour and two reverse speeds from 2½ to 5 miles per hour, all controlled from the one lever. The batteries consist of 50 cells of 90 ampere hours capacity. The front wheels are 38 inches and the rear 46 inches, equipped with 4-inch Calumet solid rubber tires.

In a test recently made of this bus by one of New York's largest automobile corporations, it developed that the bus not only made its scheduled time during a snow

storm, but that the heating apparatus kept the inside comfortable while the weather was below freezing point. The total mileage made by the bus on this day was 54, the engine using 12½ gallons of gasoline, costing 9 cents a gallon, making the cost of fuel a fraction over 2 cents per mile, and this under the very worst conditions that an automobile could be asked to operate under—snow.

The Lake Superior Mining Institute.

The eighth annual meeting of the Lake Superior Mining Institute was held last week at Duluth and the Minnesota iron ranges, ending on Friday afternoon. It was universally agreed among those present to have been one of the most satisfactory and instructive meetings ever held, while for pleasure and the comfort of those attending it it has not been equaled. With two long trains of vestibuled Pullman and private cars, with the wants of the inner man attended to by two full dining car equipments, with the entire expenses of the three days but $8, made the trip unusual. Such careful and exact arrangements had been made for the comfort of all in attendance, and such minute plans were so fully carried out that there was not the slightest hitch anywhere.

The itinerary included a trip the full length of the Mesaba and Vermillion ranges, entering the former at the western end at the Stevenson Mine, affording ample time for examination of that, the Mahoning, the Fayal and Adams, Mountain Iron and Biwabik, and both mining centers of the Vermillion, with inspection of the magnificent steel shaft houses and machinery equipments now being put in at the Sibley and Savoy mines, and the new steel shaft of the Pioneer, which is now down about 870 feet. The ore dock plant of the Duluth & Iron Range Road at Two Harbors was visited on the return.

The party included 250 of the prominent mining men, mine owners and engineers of the Lake Superior region.

At the meeting of the institute at Soudan the following officers were elected:

President, Walter Fitch, manager of the Champion Iron Company mine at Champion, Mich.

Vice-presidents, H. F. Ellard, superintendent of the Ashland Mine; W. H. Johnson, manager at Ishpeming for the Oliver Iron Mining Company; Fred Smith, agent of the Mohawk and Wolverine Copper Mines.

Managers, Graham Pope of Houghton; T. F. Cole, president of the Oliver & Minnesota Iron Companies; Amos Shepard, manager in Minnesota for Corrigan, McKinney & Co.

Treasurer, G. H. Abeel, manager of the Montreal Mine, Hurley.

Secretary, A. J. Yungbluth, auditor of the Cleveland Cliffs Iron Company.

C. R. Van Hise was elected to honorary membership, and 144 active members were added, making the total membership 401. Action on the invitation of the Canadian Mining Institute to meet at Sault Ste. Marie next year was deferred, but it is not probable that the next meeting will be held there. The treasurer's report showed a balance at the close of the year of $1538.08, an increase of $780.90 over a year ago.

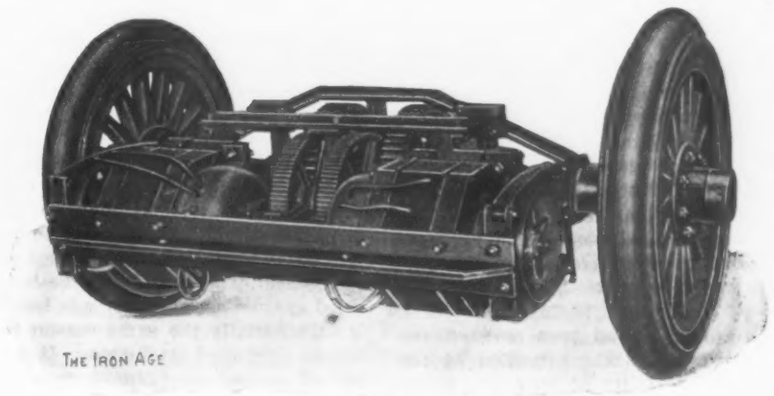


Fig. 4.—Another View of Rear Axle.

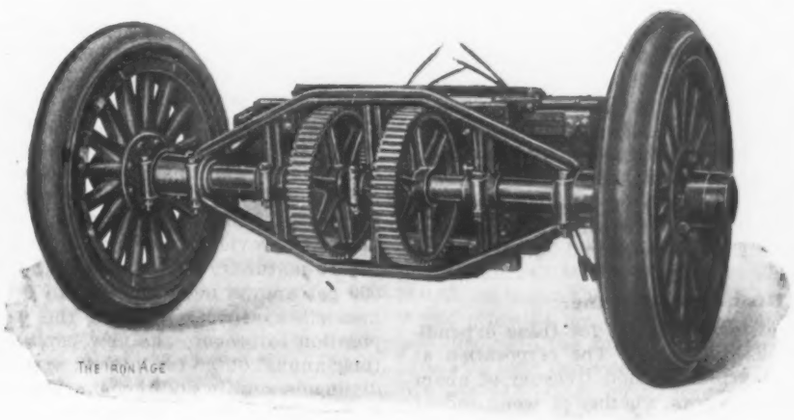


Fig. 5.—Another View of Rear Axle.

THE FISCHER MOTOR VEHICLE.

A significant statement is made in a review of the position of the Southern Pacific Railroad Company by the banking firm of Talbot J. Taylor & Co. of New York. It is to the effect that with engines operated by oil something like $4,000,000 annually should be saved.

The United States Steel Conversion Plan Explained.

The Statement of George W. Perkins of J. P. Morgan & Co.

In the action brought by J. Aspinwall Hodge, Bernard Smith and William H. Curtiss to prevent the conversion of $200,000,000 of preferred stock of the United States Steel Corporation into bonds seven affidavits were filed, among which that of George W. Perkins, a member of the firm of J. P. Morgan & Co., a member of the Board of Directors of the corporation and chairman of the Finance Committee, is the most important and interesting. We quote from it the following passages:

$40,000,000 Required.

Shortly after the organization of the United States Steel Corporation an investigation as to the extent, condition, capacity and needs of their several properties was begun by the Executive and Finance committees. Both the Executive and Finance committees have worked constantly to reorganize and readjust the business of the several subsidiary companies in order to make them work together more harmoniously and economically and with the closest co-operation, so that the stockholders might secure, as promptly as possible, the benefit of the savings from co-operative management, which savings the organizers of the Steel Corporation felt confident could be effected.

After a year's close application to these problems, and after substantial economies had been realized, the Executive Committee brought to the attention of the Finance Committee the advisability of providing about $40,000,000 cash, to be used in improving and extending the various plants of the subsidiary companies and reimbursing and capitalizing between $15,000,000 and $20,000,000 which had been expended for purchases and construction of various kinds undertaken by the subsidiary companies just prior to the organization of the Steel Corporation. The subject was considered for many weeks. The members of both committees became convinced that the expenditure of this new money would not only tend to strengthen permanently the existing earning capacities, but would increase the net profits not less than $10,000,000 a year. This was the lowest estimate of the probable increased profits that any one made, but some of the officers of the corporation advised that in their opinion such increase would equal $20,000,000 a year.

The Risk of Borrowing.

The problem of raising the funds for these expenditures presented serious difficulties. The corporation at that time had a cash surplus in their treasury of about $50,000,000. The question was whether it was prudent for the corporation to enter into obligations to expend so large a sum of money and provide the funds out of the surplus on hand or profits that might be earned. The corporation were doing a business of over $400,000,000 per annum on practically a cash basis. If business became depressed and financial stringency delayed or prevented sales or collections, it might not be possible to keep the business of the corporation on a strictly cash basis, as we desired. Even if sales continued collections would be slow. With a business of such great magnitude, therefore, it was essential constantly to have on hand and maintain a very large cash surplus, in order that the corporation to a large extent might act as their own banker and avoid the danger of being crippled even temporarily by reason of any tightness in the money markets. They could not with any reasonable degree of business prudence be wholly dependent at any time on their borrowing capacity for current cash requirements. The annual payroll for wages of employees was over $100,000,000 and their other expenditures for materials, supplies, &c., amounted in addition to over $150,000,000. If the corporation should ever need to borrow money they would need, not $1,000,000 or $5,000,000, but $20,000,000 or $30,000,000. Such a need might arise at a time of business depression or financial stringency, and it would then be impossible to borrow such a large sum of money, even on the best of credit, on any terms. The Finance Committee, therefore, determined that the corporation could not take this risk or use any part of the cash on hand with which to pay for the improvements that had to be contracted for immediately if the plants were to be put in position to meet existing demands, and that the funds would have to be raised or provided either by the issue and sale of preferred stock or by borrowing on notes or bonds.

Advantages of the Bond Plan.

The preferred stock of the Steel Corporation was then selling at about 90, and under the law it could only be issued at par for money or its equivalent in property. This would, moreover, have been a most expensive way to provide the money, because had we sold $50,000,000 of preferred stock at 90 we would have received for it but $45,000,000, and the transaction would have cost a discount of $5,000,000 the first year. It would also have cost each year thereafter 7 per cent. cumulative dividends on $50,000,000, which is $3,500,000 a year. The first year, therefore, it would have cost $8,500,000, and in the next 14 years it would have cost 14 times $3,500,000, or $49,000,000, which, added to the $8,500,000 paid out in the first year, would have made a total cost of $57,500,000 in 15 years, and after the fifteenth year a cumulative dividend charge of $3,500,000 per annum in perpetuity ahead of the common stock.

The next method considered was that of issuing $50,000,000 of second mortgage bonds. The reason that ruled against second mortgage bonds as a separate issue is substantially the same reason that ruled against the sale of preferred stock—viz.: If we had issued $50,000,000 of second mortgage 5 per cent. bonds we would have been fortunate to sell them at 95 when 7 per cent. cumulative preferred stock was selling at 90 and we would increase the charge ahead of the stocks. It was finally determined that the most economical and advantageous plan was to create and issue $250,000,000 face value of second mortgage bonds and use the bonds or their proceeds, first, in procuring the necessary cash requirements, and, secondly, in purchasing and retiring $200,000,000 par value of the outstanding 7 per cent. cumulative preferred stock. The retirement of this stock would save $14,000,000 per annum of the cumulative dividend charge, and this sum would not only provide the interest upon the whole issue of new bonds, but leave a surplus of $1,500,000 per annum, which would be sufficient to provide a sinking fund for the payment, at or before maturity, of the bonds, and leave besides $450,000 per annum net applicable to dividends on the common stock. In other words, the plan enabled the corporation to procure the new capital without increasing their annual outgo for interest and cumulative preferred dividends, and in addition provided for the reduction of their capital stock, which would inure greatly to the benefit of the remaining preferred and all the common stock.

In addition it was seen that if the $50,000,000 of new money earned the lowest estimate placed on it by any of the Steel Corporation's engineers and officials—viz., $10,000,000 a year—such earnings would of themselves nearly provide the whole interest on the second mortgage bond issue of $250,000,000.

The Syndicate and Their Profits.

It was provided in the plan that there should be a sinking fund set aside each year of the exact amount necessary, at 4 per cent. compound interest, to retire the whole $250,000,000 of bonds in 60 years. As the corporation's first mortgage bonds are being retired by a sinking fund to run 50 years, the corporation would, in 60 years, if the new plan were adopted, be left with no bond issue whatsoever and with but $300,000,000 of preferred stock and $500,000,000 of common stock outstanding against the present capitalization of over $1,400,000,000.

The Finance Committee was of opinion that the immediate effect of a proposition to withdraw from the market and retire 40 per cent. of the corporation's preferred stock would be to appreciate the value of the preferred stock, and that such market value, if above

par or above what the new second mortgage 5 per cent. bonds might be quoted at, would defeat the plan and prevent any subscription by stockholders. To go into the open market and purchase preferred stock for retirement would have been a mere gamble and would have resulted in great inequalities, besides being certain to appreciate the market value while the purchases were being made.

It became evident, finally, that the only way that the stock could be taken up was by organizing a syndicate which would undertake to guarantee absolutely the whole or a large portion of preferred stock and cash, and deposit the stock with some custodian and hold it until the plan could be carried through. It was recognized that it would be difficult to get men to do this because of the risk involved and the necessity for locking up so large a sum of money for a long period of time. It was considered that it might take from a year to a year and a half to carry through such a plan in such a large corporation, with thousands of stockholders scattered all over the world. Men had to be found who would buy or furnish preferred stock under an agreement that would permit of its being locked up, beyond their power to sell, for a year and a half, and it was finally found impossible to secure a pledge of the entire $200,000,000 of preferred stock, but that the best that could be done was to organize a syndicate that would agree to the following, viz.:

1. Purchase and lodge with J. P. Morgan & Co. $80,000,000 of preferred stock.

2. Agree to exchange all of this or only 40 per cent. of it, at the option of the Steel Corporation, for second mortgage bonds.

3. Take second mortgage bonds from the Steel Corporation at par, in exchange for $20,000,000 in cash.

For this the Steel Corporation were to allow said syndicate 4 per cent. commission on all the bonds it took in exchange for stock, and 4 per cent. commission on all the bonds it took at par for cash; so that if the transaction stood in the end in that form—viz., if $80,000,000 of bonds were issued for stock and $20,000,000 of bonds were issued for cash—the Steel Corporation would have paid to the syndicate 4 per cent. on $100,000,000, or $4,000,000; and J. P. Morgan & Co. would have received, for guaranteeing the whole $100,000,000, for handling the syndicate and the securities and for finding a market on behalf of the syndicate, one-fifth of $4,000,000, or $800,000. The contract, moreover, was made subject to the approval of the stockholders.

Contingency on Syndicate's Commission.

The Steel Corporation reserved the right to offer to every preferred stockholder in the corporation the option to subscribe for these new bonds to the extent of 40 per cent. of his preferred stock. In view of the fact that the Steel Corporation had made this contract with the syndicate, if every preferred stockholder exercised his right and took 40 per cent. of bonds in exchange for his stock, the syndicate would be placed in the position where it would only get $32,000,000 of its $80,000,000 of preferred stock converted into bonds and would be left with $48,000,000 of preferred stock on its hands, although it pledged itself to tie up this $80,000,000 of stock for 18 months, and could not sell it or in any way dispose of it, no matter what became of the price of the stock or what became of business conditions in the country or how much any syndicate subscriber might need the funds. In consideration of all this risk the syndicate was given the right to receive a commission of 4 per cent. on such bonds as were issued to preferred stockholders not members of the syndicate. The $10,000,000 maximum to the syndicate can only be received by it, provided the entire transaction of purchasing $200,000,000 of preferred stock and retiring it, and then issuing and placing on the market $250,000,000 of second mortgage bonds at par, is completed and consummated.

New Cash Means More Earning Power.

It is true that the money could have been raised by stopping dividends on the preferred and common stock for one year or on the common stock alone for two years and a half. This course was deemed unfair to the stockholders, and particularly to the holders of common stock, which stock was held by thousands of small holders, and which in many cases had been taken in exchange for stock of other companies who were paying dividends. There was a moral obligation on the part of the directors of the Steel Corporation to pay to these people a reasonable dividend on the common stock if it should be found that it was being earned. This stock was taken by people in the belief that the directors of the Steel Corporation would make good their expectation that great economies could be effected in the handling of the business on the co-operative management plan, and that these economies would inure to the benefit of the stockholders through dividends. When, after the companies were all brought together, the Finance Committee found that the organizers of the Steel Corporation had not overvalued the various properties, but that they were, in the form in which they were held by the Steel Corporation, worth the face value of all the Steel Corporation's outstanding bonds and stocks, and when it was found that the common stock was easily earning substantial dividends, there was but one fair thing to do—viz., to commence paying a reasonable dividend on that stock. When, later on, it was found that new money could be used in co-ordinating and improving the plants, and used in such a way as to make it earn at least $10,000,000 a year for both the preferred and common stockholders, the proper business course to follow was to provide this money on the very best terms possible which might be found to be just and equitable alike to all stockholders, and not stop the payment of dividends to people who were probably in innumerable instances depending upon income upon their investment in our stock for their support.

Contract Profitable to the Corporation.

When the plan was finally approved by the members of the Executive and Finance committees, their recommendation was coupled with the understanding had with me that the firm of J. P. Morgan & Co. would undertake to assure the success of the plan by forming a syndicate. It was then believed by my firm and by many of the directors of the United States Steel Corporation that the plan, as soon as published, would have the effect of increasing the market value of the preferred stock, which in great measure proved to be the fact, and that in all probability such market value would appreciate over par. If such happened to be the effect the plan might be defeated, for stockholders whose 7 per cent. cumulative preferred stock was worth more than par in the market would not be willing to sell or exchange the same for a 5 per cent. bond which would probably not be worth par.

I discussed the subject of participating in the syndicate with only three directors prior to the meeting of the Board of Directors on February 4, 1902, at which the plan was approved by the directors, and when instructions were given for the drafting of the contract and the preparation of the papers. When the plan was first voted upon by the directors and approved by them—namely, on February 4—only one of the directors present at the meeting other than Mr. Steele and myself, as members of my firm, had been asked to participate in the syndicate or had any interest or expectation directly or indirectly therein, and after excluding the members of my firm (who withdrew and did not vote) 15 disinterested directors voted at such meeting in favor of the plan.

When the plan was submitted to the directors, at the meeting on February 4, it was the sense of the meeting that a syndicate was necessary to assure the success of the plan. Thereupon my firm endeavored to form such a syndicate. The syndicate agreement of February 12, 1902, was then drafted, and I personally solicited parties to join in the syndicate. The largest participations in the syndicate were taken only after urgent solicitation by me and upon my agreeing that my firm would take an equal amount. The participation taken by Mr. Schwab, the president of the corporation, and by some of the other directors, was upon the understanding that if we found other parties to take any part of such participations we would do so and thus

relieve them. My firm considered, and I believe most of the directors believed, that the syndicate contract was not a particularly profitable one for the syndicate, but was a most desirable one for the United States Steel Corporation, and that only those largely interested in that corporation could be induced to take any large risk in the syndicate. In no instance did we find any stockholder willing to subscribe for the full amount of his holdings in preferred stock.

No Secret About the Arrangement.

I was advised and believed that there was no objection to a director taking a participation in the syndicate, if the contract was fair and reasonable and for the best interests of the corporation, and that there could be no legal objection to any such personal interest if the contract was made subject to the approval of the stockholders and was submitted to them for their action, with the disclosure of the fact that directors were interested in the syndicate.

I personally drafted the circular of April 17, 1902, which went to the stockholders of the United States Steel Corporation, and in it I inserted the following statement:

"To further the success of the plan there has been formed a syndicate, including some directors, which will receive four-fifths of the 4 per cent. compensation to be paid under the contract with J. P. Morgan & Co., mentioned in the notice of stockholders' meeting."

I submitted this circular to counsel and it was approved by counsel. I intended in and by such circular to disclose the fact that directors were interested in the syndicate. I understood by the use of the word "some" that I was indicating less than all, that the word "some" was properly used in contrast with "all," and that it conveyed to the stockholders knowledge of the contract and of the fact of the directors' interest or participation. Between the issue of that circular to the stockholders, on or about April 17, 1902, until the meeting of the stockholders on May 19, 1902, any stockholder could have by inquiry easily ascertained exactly what directors were interested in the syndicate. There was no concealment or attempt at concealment in the slightest degree. As matter of fact no stockholder of the United States Steel Corporation prior to the meeting of the stockholders at which the syndicate contract was approved ever made any inquiry as to which or how many of the directors were participants in the syndicate, or otherwise in regard to the syndicate.

The Chicago "Pullet" Countershaft.

A simple and compact countershaft of novel design, called the Chicago "Pullet," is here illustrated. It is thrown in or out by a pull on the cord attached to a weighted lever, A, which is set on a pivot with just enough eccentricity to throw in the friction disk driving the main pulley or cone. The sectional drawing shows the action of the eccentric in throwing the clutch. The weight C is proportioned to hold the friction well in place without undue pressure, and the contact roller G is made of sufficient size so that it runs comparatively slow. It does not run when the clutch is out. Allowance is made for taking up any wear, so that the weighted lever will act at the best angle and give the proper throw to the eccentric.

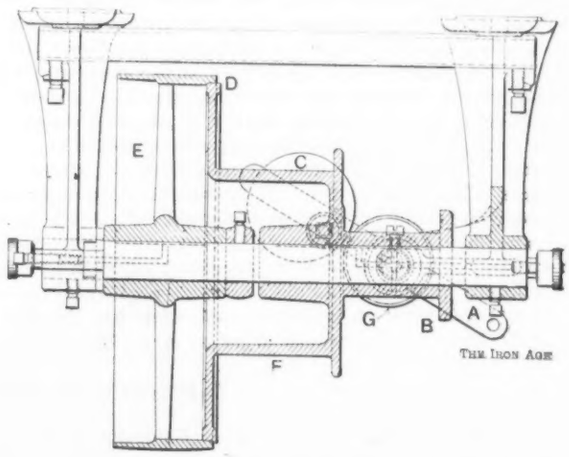
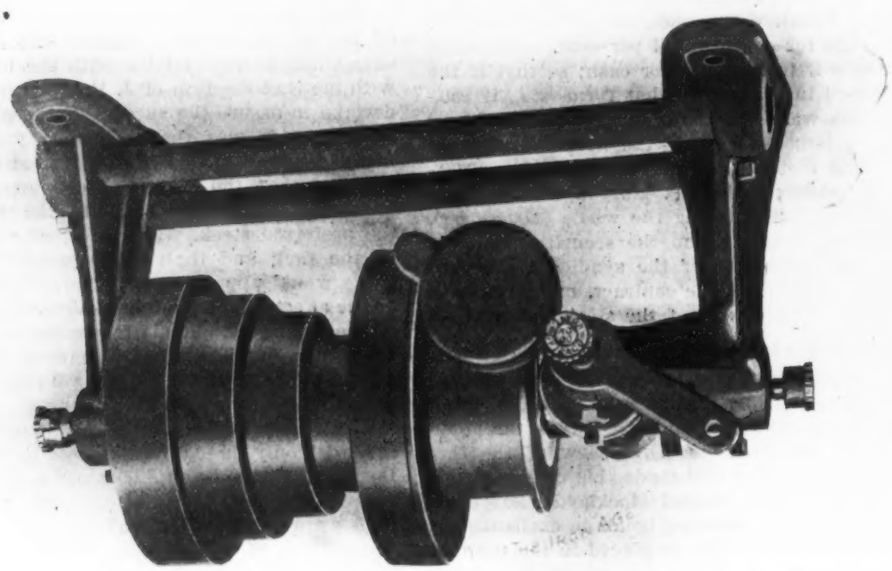


Fig. 2.—Section of Countershaft.



THE CHICAGO "PULLET" COUNTERSHAFT.

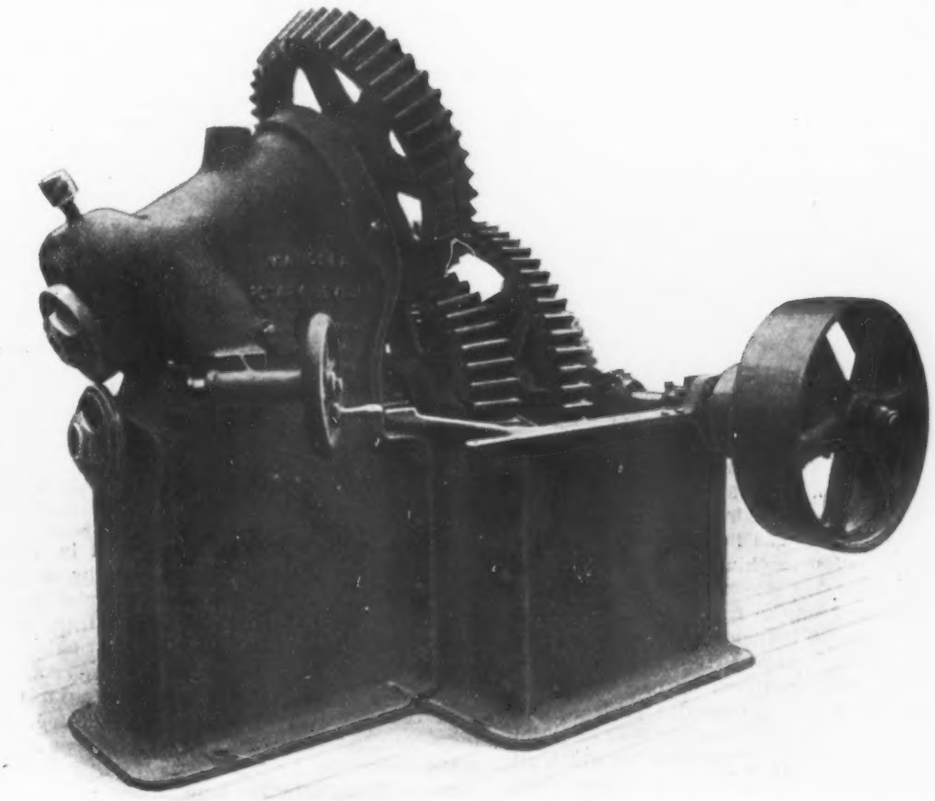
The shaft is stationary in the hanger and the pulleys revolve upon it, thus giving them a long bearing. The shaft is drilled longitudinally from both ends and grooved to distribute the lubrication, which is effected by grease cups. The contact roller also revolves upon its shaft and is lubricated in like manner.

In order to accommodate different settings and directions of drive the frame is constructed to take the throw over lever at either side. The method of mounting upon heavy pipe allows the countershaft some adjustment in setting up, which is often quite convenient when room is contracted or certain joists must be used

to bolt to. This construction also allows the use of a single driving pulley or a cone pulley of several steps. This countershaft is made by Hill, Clarke & Co. of Chicago.

The Waugler Rotary Bevel Shear.

The Waugler rotary bevel shear has been placed on the market by the Scully Steel & Iron Company of Chicago. The upper cutter is a plain disk having a periphery parallel to its axis of rotation, and the lower cutter is mounted on a horizontal shaft rotating in a vertical plane, which interesects the plane of the upper cutter. Its periphery is beveled at both corners with an intermediate flat portion serving as a support for the work, and the cutting edge of the lower cutter is at one side of the flat portion and upon the inner bevel, and therefore entirely within the plane of the cutter, so the strain is vertical and at right angles to the axis or shaft of the lower cutter. Both upper and lower cutters can be reversed and used on either edge. The upper cutter shaft is adjusted by the screw shown, and is held in place by weights. The machine is fitted with friction pulley and is powerfully geared. It will bevel ¾-inch plate. It can be direct geared to electric motor if desired.



THE WAUGLER ROTARY BEVEL SHEAR.

New Publication.

The Municipal Year Book. Published by the Engineering News Publishing Company, New York. Pages, 310. Price, $3.

This publication, which is edited by M. N. Baker, associate editor of the *Engineering News*, is the first issue by the publishers of a work of this character. It is designed for the use of all persons desiring information relative to the various municipalities throughout the United States. It is, of course, particularly interesting to contractors, but will be found of value to many others. It gives the population, assessed valuation, names of principal officials, ownership of public utilities and information regarding water supply, sewerage, street cleaning, street sprinkling, garbage, fire and underground electric service in all incorporated places in the United States and in all New England towns of 3000 population and upward by the census of 1900. It is claimed that never before has so complete an exhibit of the relative extent of municipal and private ownership been presented. This information is first given alphabetically by States, together with the other facts relating to the various cities and towns. It is next presented alone in compact tabular form with the cities arranged in order of population. The book is based on special returns, made with a very few exceptions by the city officials of the several places included. The statement is made that formal reports were secured from all but five or six of the 1524 cities and towns included. This shows the great interest taken in the project.

This volume shows that the town dweller of to-day, even though he lives in a small community, has at his command a wonderful number and variety of public services. Of the 1524 places of 3000 population and upward, by the census of 1900, at least 1475 had water works, 1471 electric lights, 1466 telephones, 1096 sewers for household wastes, 981 gas works and 928 street railway systems. In other words, only some 50, or about 3 per cent. of these 1524 places, are without water works, electric lights and telephones, a little over 400 without sanitary sewers and 500 to 600 without gas works and electric railways.

Eight cities having 20,000 population and over are still without sanitary sewerage systems as follows: Baltimore, Md., 508,957; New Orleans, La., 287,104; Allentown, Pa., 35,416; Topeka, Kan., 33,608; Gloucester, Mass., 26,121; Warwick, R. I., 21,316; Columbia, S. C., 21,108; Shenandoah, Pa., 20,321.

The constant increase in the number of water purification plants in the United States is one of several indications that municipal health problems are at last beginning to receive something like adequate attention in the more progressive communities of the country. The returns show 243 cities which can be classified under some one of the various methods in vogue for improving the quality of public water supplies. In addition 68 places merely reported that their water was filtered.

Carbureted Alcohol vs. Pure Gasoline in Automobiles.

BY MARIUS C. KRARUP, NEW YORK.

To what extent economy in fuel consumption is an indication of reliability and merit of an automobile in other respects is a much debated question, but the fact that some of the most celebrated manufactures are notoriously wasteful of fuel while they otherwise give good satisfaction as pleasure vehicles or instruments of sport, speaks rather strongly against snap judgment on this point. Too much or too broad importance should therefore not be attached to the figures given in the following comparison between results obtained with carbureted alcohol in France and those obtained with gasoline in this country. Their significance lies mainly in the argument which they offer in favor of alcohol as a fuel, and not so much in their bearing upon the merits of the various vehicles.

When it is noticed, however, that a 5½ horse-power Georges Richard vehicle weighing 1551 pounds requires only 36 gallons of carbureted alcohol per 1000 ton-miles (propelling 1 ton 1000 miles or 1000 tons 1 mile) in France, while a 10 horse-power Richard vehicle of practically the same construction, though weighing 2000 pounds, requires 70 gallons of gasoline for doing the same amount of work in America, it would be rash to ascribe the difference to the fuel.

Roads and weather, the skill of the driver and especially the relations between the weight and the power of each machine are factors which tell heavily and variably according to circumstances. On the other hand the difference in fuel consumption in the case referred to is sufficiently marked to suggest that carbureted alcohol, if not better, is probably at least an acceptable substitute for gasoline.

Among the competitors in the consumption trials held by the Automobile Club of America on May 30 the two Darracq machines (see Table III) were of the same pattern and covered the same route under the same circumstances; yet there is an indicated difference in fuel amounting to 17 gallons per 1000 ton-miles.

The De Dion-Bouton machine in our contest shows a requirement of 98 gallons of gasoline per 1000 ton-miles, while the De Dion-Bouton machine in the French test requires only 30 gallons of alcohol. The discrepancy is only partly explained by the fact that the De Dion motor in one case was of French and in the other of American make. As it happened, the American built vehicle in this instance was driven by one whose experience was so limited that it caused a good deal of surprise to see the machine go through as well as it did and in full conformity with the strict rules by which all stops for adjusting or tinkering with the motor were prohibited.

Special factors of this nature undoubtedly influenced the results in both tests to such an extent that comparison by the figures in detail becomes unsafe. But in the large features they still tell a story the moral of which it would be unreasonable to ignore.

In the first of the accompanying tables are given the records of seven vehicles which earned gold and *vermeil* (gold and silver alloy) medals in the touring section of the *Circuit du Nord* alcohol tests, held under Government supervision in France on May 15, 16 and 17 this year, and of one vehicle (the Panhard-Levassor) for which only a bronze medal was obtained, but which is included in the list because its construction is well known also in this country. The route covered a distance of 730 km., or 452½ miles, and was divided into three stages. The roads were in good order and fairly level, but thoroughly drenched with rain, which continued during the whole test. A strong wind blew on all of the three days. Occasionally it hailed. The records of a Darracq machine, which obtained a gold medal, is left out of the table because the figures given in the official list (reproduced in *Le Génie Civil*) are inconsistent, suggesting a clerical error. Two Bardon machines were in the test, but the record of one of them is omitted, being almost identical with the one given. Altogether 24 vehicles received awards, and the fuel consumption did not in any of them much exceed that given for the Peugeot machine in Tables I and II. The awards were made, not solely on the basis of the fuel consumption, but also with a view to regularity of operation and other points of merit. The maximum speed allowed was 30 km. per hour.

Table I.—Touring Automobiles in Alcohol Trials in France.
Distance, 730 km. (452½ miles).

Name of manufacturer.	Horse-power. (French unit.)	Weight in kilogrammes. Empty.	Weight in kilogrammes. With supplies and passengers.	Average speed. Kilometers per hour.	Fuel consumption. Liters.—Total.	Fuel consumption. Liters per tonne-kilométrique.
Peugeot	5	244	423	25.986	44.470	0.144
Delahaye	6	572	1,029	24.479	69.330	0.092
De Dion-Bouton	8	602	910	18.841	61.945	0.093
G. Richard	5½	424	705	16.398	57.070	0.111
Chenard & Walcker	12	766	1,202	23.341	57.310	0.065
Bardon	5	726	1,100	18.788	63.170	0.078
Société Nancéenne	12	915	1,337	30.440	94.610	0.097
Panhard et Levassor	8	943	1,284	28.285	124.910	0.133

In the second table the weights and measurements of Table I have been converted into American terms, except that the horse-power figures are left unaltered, and that the consumption, instead of being indicated in liters per *tonne-kilomètrique*, is given for 1000 ton-miles in gallons, thereby avoiding fractions. No illusory accuracy in decimals has been attempted. The weight of the empty vehicles has been omitted in this table, no counterpart being available for comparison in the records of the American tests.

Table II.—Touring Automobiles in Alcohol Trials in France.
Distance, 452½ miles (730 km.)

Name of manufacturer.	Horse-power.	Weight with supplies and passengers. Pounds.	Speed. Miles per hour.	Fuel consumption. Gallons. Total.	Fuel consumption. Gallons per 1000 ton-miles.
Peugeot	5	931	16½	9.78	46
Delahaye	6	2,264	15½	15.25	30
De Dion-Bouton	8	2,002	12	13.62	30
G. Richard	5½	1,551	9 1-3	12.55	36
Chenard & Walcker	12	2,644	14 4-5	12.60	21
Bardon	5	2,420	12	13.90	25
Société Nancéenne	12	2,941	19½	20.81	31
Panhard et Levassor	8	2,825	18	27.48	43

The American test is represented in Table III by selections from the results published by the Automobile Club of America. These vehicles traveled over the route from New York to Southport and return, which measured a fraction over 100 miles, and all of them covered it under the rules entitling them to a "non-stop certificate" and at an average speed so close to 15 miles per hour that the variations may be neglected. The selections correspond, therefore, as closely as possible to those made from the French tests. While several of the vehicles in the latter are built particularly for low speed, and thereby obtain an advantage in fuel economy, it seems that, on the whole, the two tests are near enough together in speed to permit of a fair comparison, and the doubts raised on this point in a previous article on the alcohol problems (*The Iron Age*, July 10) may therefore be set aside. The American route, however, was quite hilly and called the low gear into requisition so frequently that the writer, from his observations in going over this route, would estimate the increase in fuel consumption from this source at possibly 20 per cent. Accordingly a column has been added in Table III reducing the figures for 1000 ton-miles by one-sixth, in the belief that the figures thus arrived at more nearly express the results as they would have been obtained under conditions of equality with the French event. The weights indicated in this table include fuel supplies and passengers, the latter reckoned at 150 pounds each, while the weights in Tables I and II were ascertained by actual scale measurement and repeatedly checked during the progress of the test. The round figures giving the gasoline consumption, mostly in whole gallons, in the New York test, suggest a somewhat rough and ready system of either measurement or recording which contrasts singularly with the three decimals in the liter column of Table I. In subsequent contests in this country greater accuracy in measurements would undoubted-

ly be desirable, as there can be but little scientific interest in trials which are not surrounded with all practicable safeguards in regard to the records of the results as well as the equality of conditions for the participants. To permit direct comparison of the quantities of fuel consumed, a column has been added in Table III showing the actual consumption of gasoline multiplied by 4½, the distance covered in the alcohol test being very closely four and one-half times longer than the course of our home contest. In converting liters per *tonne-kilomètrique* into gallons per ton-mile, in Table II, the writer has multiplied by 110 and divided by 341, which figures give results sufficiently accurate for all practical purposes.

Table III.—Selected Records from Fuel Consumption Tests Held by the Automobile Club of America.

Distance, 100½ miles.

Name of manufacturer.	Horse-power.	Weight, including supplies and passengers. Pounds.	Speed.—Miles per hour.	Fuel consumption.—Gallons.—Total.	Gallons per 452½ miles.	Gallons per 1000 ton-miles.	Estimated deduction of 16 2-3 per cent.
						71	59
U. S. Long Distance.	7	1,660	15	4½	19⅛	51	42½
Darracq	9	1,560	15	5	22½	64	53
Darracq	9	1,750	15	4⅛	18 9-16	47	39
Packard	12	3,010	15	6⅛	27 9-16	41	34
Mors	12	2,900	15	7	31½	48	40
G. Richard	10-12	2,000	15	7	31½	70	58
Autocar	8½	1,500	15	5	22½	67	56
De Dion-Bouton	4½	1,225	15	6	27	98	81½
Fournier-Searchmont.	8	2,450	15	7	31½	57	47½
Haynes-Apperson	6	1,700	15	5	22½	59	49
Knox	6	1,710	16	6	27	70	58
White (steam)	6	1,750	15	5¾	25⅞	66	55

Among the observations to be made from the above tables only few point a conclusive lesson, but many are richly suggestive.

The French made De Dion-Bouton motor has since 1895 shown a steady yearly advance in fuel economy, and it would not be very surprising to find it among the most economical consumers of carbureted alcohol, if it were not a high speed motor; while alcohol in other cases has been shown much better adapted for low speed motors. Probably its good showing with alcohol finds its best explanation in the low speed of the vehicle (12 miles, see Table II), which suggests that it may have been run mostly on its high gear at slow motor speed. The Pierce vehicle in the New York test furnishes a means for comparison. It too was fitted with a French built De Dion motor, but apparently its somewhat smaller power equipment per pound of weight (and the hills on the route) prevented it from making as good a showing of economy, although gasoline was the fuel employed.

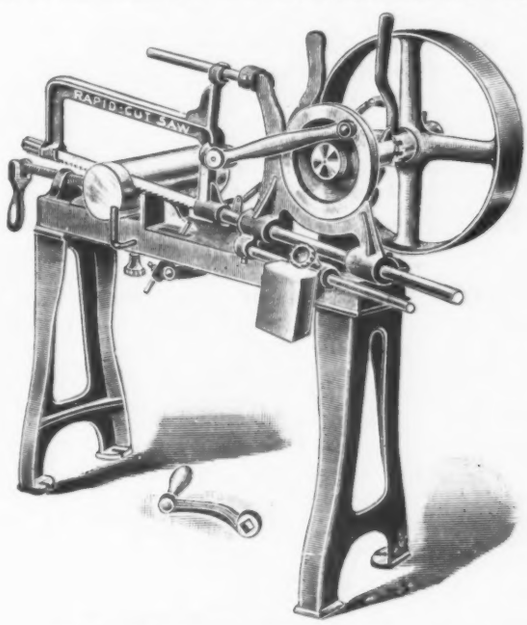
In this, as in several other instances referred to in two previous articles on this subject, the careful observation of results which was employed in the alcohol tests has thrown valuable sidelights on motor economy in general, and especially has tended to show that the motor medium speed and medium weight is the engine of the future, irrespective of the fuel used. And by implied reasoning the same careful observations have sustained a favorable opinion of carbureted alcohol as a power source. Most of what seemed its peculiarities at first has been proved to arise from shortcomings in motor construction, by the removal of which the motor was improved for operation with either fuel. That the improvements—mainly in the carbureter—were more imperatively demanded for their use with alcohol than for the ordinary use with gasoline became a matter of no great consequence after they had been actually consummated. In the recent Paris-Vienna race several noted chauffeurs, and among them M. Réné de Knyff, employed the alcohol mixture in their vehicles of their own free choice and thereby testified strongly to the belief, which is now becoming more and more general where the facts are best known, that carbureted alcohol and gasoline may be used interchangeably in the best automobile motors of the present day.

The comparison of fuel economy between the Circuit du Nord test and our 100-mile nonstop and cousumption test, summarized in Table III, would seem to corroborate this verdict pending further investigations.

As a matter of curiosity—which has otherwise nothing to do with the subject in hand—the record of one steam vehicle has been included in this table. Taking its correctness for granted, it represents the first instance of public record in which a steam engine has equalled internal combustion motors in fuel economy. In this respect the record is nothing short of revolutionary, as heretofore all American built steam vehicles have consumed from two to five times as much gasoline as gasoline vehicles for the same amount of work, and have made their way into public favor in spite of this drawback. Two other White steam carriages did nearly as well on the same occasion, and their performances deservedly attracted widespread attention. It is perhaps not too much to say that if the system of measurements and records had borne out an assumption of great accuracy, with the same results, a still more pronounced sensation would have been created. As regards the use of carbureted alcohol as fuel for steam vehicles, of the White or any other type, flattering results obtained with Serpollet steam carriages in France indicate that there should be no difficulties whatever as soon as the question of the price of the fluid shall have been satisfactorily settled.

The Robertson Power Hack Saw.

In the power hack saw made by the Robertson Mfg. Company of Buffalo, N. Y., the bearings for the sliding bars of the frame are in a direct line with the blade,



THE ROBERTSON POWER HACK SAW.

thus insuring perfect alignment. The crank pin is also in line with the center of the saw frame, so that there is no side pressure on the blade when in motion. A sliding weight provides adjustment for hard or soft metals. An automatic device stops the machine upon the completion of a cut, or it may be set to cut any required depth. It will cut up to 4½ inches, round or square. When the frame is raised for setting work a gravity lever locks and holds it in position. The machine is furnished with a clutch, so that a countershaft is not necessary.

The Grandduchy of Luxemburg produced only 4,455,179 metric tons of iron ore, valued at 11,770,046 francs, in 1901, as compared with 6,171,229 tons in 1900 and 5,995,412 tons in 1899. The production of pig iron, which reached 982,930 tons in 1899, declined to 970,885 tons in 1900, and dropped to 916,404 tons in 1901. The production of the three steel works was 257,055 tons, including 13,159 tons of ingots, 167,428 tons of blooms, billets and slabs, 27,057 tons of rails, 12,700 tons of sleepers and 36,711 tons of various finished shapes. They were therefore far below their capacity.

Moisture in Lake Superior Iron Ores.*

BY N. P. HULST.

Of the 20,589,393 tons of iron ore shipped from the Lake Superior region in 1901 it is to be noted that 88 per cent. was of the variety we call soft hematites. If the Chandler and Pioneer products are classed with the soft hematites, then 94½ per cent. of the total product of 1901 shipped from the Lake Superior iron mines was of this variety.

All of the soft hematite ores carry a considerable percentage of moisture. In the very complete list of cargo analyses for the season of 1901 we find the product of one mine carrying moisture in its two grades of ore of 17.12 per cent. and 16.24 per cent. respectively. This list of cargo analyses shows that some 30 different grades of ore carry moisture exceeding 12 per cent. of their weight. In addition there are some 62 other grades of ore in the list which contain moisture from 10 per cent. to 12 per cent. of their weight. The amounts shipped of these high moisture ores are as follows:

	Tons.
Containing 12 per cent. and above	3,356,242
Containing 10 per cent. and up to 12 per cent	6,077,737
Total	9,433,979

or practically 46 per cent. of the entire shipments of ore for 1901.

It has been found that it would not be advantageous to remove all of the moisture from a soft hematite prior to shipment, because of the dust losses which would ensue in handling from mine to furnace, and on account of annoyance from dust in handling.

Some experiments that have been made show that several per cent. of moisture should be left in ores, these percentages to be left varying with different ores in order to prevent dust losses.

For Norrie ore, 4 per cent. moisture should remain.
For Tilden ore, 5 per cent. moisture should remain.
For Mountain ore, 6 per cent. moisture should remain.
For Chandler ore, 2 per cent. moisture should remain.

Assuming that these experiments give reliable data to proceed from, then the fine grained Mesaba ores, like that of the Mountain Iron Mine and several others which contain between 12.46 per cent. and 15 per cent. moisture, can allow the removal of 6.50 to 9 per cent. moisture, while the fine grained dusty ores of the Mesaba Range may require 6 per cent. moisture to prevent dustiness in handling. Some of the Mesaba ores, and probably all of those of other ranges containing 10 per cent. and 12 per cent. moisture, being of coarser physical structure will not require more than 4 or 5 per cent. moisture to be left in them to overcome dust losses in handling.

It may be stated with considerable confidence that 6 per cent. of moisture may be without detriment removed from quite all of the soft hematites carrying 10 per cent. or more of moisture where the physical structure of such ores show a more or less coarse grain.

Will it pay to remove some 6 per cent. of moisture from the class of ores I have named? If so, in what direction will the gain be made? Primarily the saving would be in the freights. While I am not fully informed as to the freight from Lake Erie to furnaces, the following figures approximate correctness, or are sufficiently so for our calculations:

Mesaba Range Ores.

	Cents.
Rail freight from mine to Lake Superior	80
Vessel freight from Upper Lake docks to Lake Erie	75
Rail freight from Lake Erie docks to furnaces	80
	$2.35

Gogebic Range Ores.

Rail freight from mine to Lake Superior	40
Vessel freight from Upper Lake docks to Lake Erie	75
Rail freight from Lake Erie docks to furnaces	80
	$1.95

Marquette Range Ores.

Rail freight from mine to Lake Superior	25
Vessel freight from Upper Lake docks to Lake Erie	70
Rail freight from Lake Erie docks to furnaces	80
	$1.75

* A paper read before the Lake Superior Mining Institute.

Six per cent. of the moisture removed would save 6 per cent. of the freights, which, for the high moisture ores of the ranges named figure out as follows:

	Cents.
Mesaba	14.10
Gogebic	11.70
Marquette	10.50

Other probable gains would result from the partial drying of ores—viz., greater ease in unloading cars or dock pockets; reduced dust loss in furnaces, since the volume of steam driven out of these ores, constituting part of the furnace burden, would be diminished in proportion as the moisture is diminished; reduced fuel required for smelting, due to a smaller amount of water to be evaporated from the ore charges.

Neglecting altogether these indefinite and possibly uncertain savings, we may base our calculations only on savings arising from freighting 6 per cent. less tonnage of ore. The actual gain would be represented by the difference between the sum saved in freights and the cost of the removal of the required amount of moisture.

This cost of drying the ore to the required percentages of moisture will be made up of fuel, labor, wear and tear of plant, interest and cost of installation. In correspondence had with a firm engaged in building dryers for varied purposes (which firm have had years of experience in such work) they guarantee that dryers of their construction will evaporate 10 pounds of water to 1 pound of fuel used. On this basis the removal of 6 per cent. of moisture from 1 ton of iron ore would require the expenditure of 13.44 pounds of coal. On account of freight only the best coal is economical at the mines. This may be figured to cost $3.50 per ton. Therefore the fuel cost to remove 6 per cent. of moisture would be 2.51 cents per ton; labor cost would be 1 cent per ton; interest and repairs, 7 mills per ton; a charge of 1 cent per ton would sink the cost of the drying plant in four or five years. I should state that the items of fuel, cost of labor and of interest and repairs were given me by my correspondent, the Cummer Dryer Company of Cleveland, Ohio. We have no reason to doubt their correctness. The above items make a total of 4.58 cents per ton. Adding 1.75 cents per ton for fuel for engine rotating the dryers, engineers and cost of bringing the ore to the dryers, and contingencies, and we have 6.33 cents per ton as the total for removing 6 per cent. of moisture from ores under consideration. In a plant of magnitude equipped with labor saving appliances I should expect that the cost of drying might be brought down to 6 cents or less per ton.

Summarizing the foregoing data, we have:

Saving of freight on Mesaba ore, 14.1 cents per ton; cost of drying, $0.0633; gain, $0.0777.
Saving of freight on Gogebic ore, 11.7 cents per ton; cost of drying, $0.0633; gain, $0.0537.
Saving of freight on Marquette ore, 10.5 cents per ton; cost of drying, $0.0633; gain, $0.0417.

The soft hematites of the Marquette and Gogebic ranges carrying high moisture might, without detriment, have 7 per cent. of moisture removed, so that the gain resulting from drying them would be about the same as with the drying of the Mesaba high moisture ores.

Even should freights go lower than the figures in my computation, reducing thereby my estimated gains, still there is good reason to feel confident that at least 5 cents per ton saving may be secured by a partial drying of the high moisture ores.

In order to secure this saving it would be necessary to keep the ore thus dried continually under shelter from the time it leaves the drying plant until it reaches the furnaces. This would involve expenditures on the part of the railway companies, both on their car equipment and on their docks. Expenditures would also be necessary at the underground mines to provide shelter for ores dried during the winter months, or when not shipping. But for the railroads as well as the mines the unloading of the drier ore would cost less. With protection to laborers from the weather there would be no rainy day lay-offs to disorganize the working force.

Experiments have demonstrated that ore dried, or partially dried, absorbs only a fraction of 1 per cent.

of moisture from the atmosphere for a long period of time when under shelter.

Only a few years ago the varying moisture in the soft hematite ores did not have recognition to the extent of affecting their market values. To-day, however, the buyer takes closely into account the moisture an iron ore contains, and he imposes penalties on the mine operator in case the average of moisture in the season's shipment of his ore exceeds the guaranteed percentage. For his guide in buying, the purchaser of Lake Superior ores can now consult an annually published and complete list of average analyses of all cargo shipments of every grade of ore shipped during the previous year. This list of analyses gives not only the percentage of moisture each of the different grades of ore contains, but it also gives the exact percentage of iron an ore in its natural condition contains, as well as the percentage each iron ore contains when dried at 212 degrees F.

That the problem of partially drying ores is one well worth profound consideration is seen from the foregoing. Five cents per ton, if saved on the 1901 tonnage of such high moisture ores as I have cited—viz., 9,433,979 tons, would have amounted to $471,699.

Are We Too Prodigal?

BY E. T CLARAGE, CHICAGO, ILL.

Illustrating the tendency of the times is the story of the manager of a large mercantile business who wanted to hire an office boy. He had two applicants to whom he stated that he was busy for the moment, and asked them to open two packages while they were waiting. One of the boys patiently untied the string, wound it up neatly, took off the paper wrapper and folded it up nicely. The other one simply whipped out his pocket knife, cut the string, tore off the paper, threw it into the waste basket and laid the contents before his employer before the more methodical boy had the first knot untied. I leave it for you to decide which boy got the place, though I think most modern business men will agree that time is worth more than paper and string.

But the question is, are we not carrying this too far? A short time ago I saw a mass of tangled telegraph wire that the linemen had simply thrown in a ditch. It was cheaper to use new wire than straighten out the old. The way we squander iron is astonishing. Get on a street car in any large city and count the pieces of iron you see lying in the street in a journey of only a few blocks. String and paper we can produce as long as the soil lasts, but how about iron and coal?

During the year 1901 in the United States alone we robbed the earth of nearly 29,000,000 long tons of iron ore, or about 812 pounds per capita. Our product of pig iron was nearly 16,000,000 long tons, or about 448 pounds per capita.

Large as this seems, it is nothing compared with our consumption of fuel, the total coal mined during the year reaching the enormous amount of 292,000,000 tons, or 7300 pounds for every man, woman and child in the country. Think of a pile of coal weighing 2000 pounds, then imagine 1000 heaps of this size in a row, then think of 1000 rows; then, if possible, think of 292 times this amount.

Without doubt, in spite of our prodigality, a considerable proportion of the iron is collected in the shape of scrap and given back to us in different form. The junk dealers may be a blessing to posterity.

With coal it is entirely different; when once used it is gone forever. Probably not over 10 per cent. of the stored power in the total coal mined is made available for man's use. At least 90 per cent. goes up the stack in smoke or waste heat. So bountifully has mother earth supplied us with coal deposits that there has been little effort to reduce the process of combustion to such a scientific basis that there would be little or no waste of this precious heat.

Our consumption of coal and iron cannot be computed even for 100 years ahead, so great is the ratio of increase.

Vast though the deposits may seem, they are not inexhaustible, and one cannot help thinking that we are like the improvident parent who squanders his patrimony and leaves his progeny to shift for themselves.

Can Panics Be Prevented?

A highly interesting address was delivered by S. R. Flynn, president of the National Live Stock Bank of Chicago, before the convention of the Minnesota Bankers' Association, in which he discussed the subject "Can Panics be Prevented?" He studies the causes of bank panics and takes the ground that they are not unmixed evils, and says:

I have no intention to ascribe panics to the will of God; yet I may say without hesitation that panics cannot be prevented by human legislation. Legislation cannot remove or even reach the great first cause of all financial and business disasters—overconfidence. All other causes I have given, all other causes that others give, are not causes; they are effects or aggravations. It is the fashion to attribute financial crises and panics to bad banking or bad monetary laws. Bad banking and bad financial laws aggravate crises, intensify panics and prolong periods of depression, but they do not cause panics. I do not intend to go into the causes and history of all the financial troubles of this and other countries. It suffices to say that they invariably follow periods of overconfidence. Whenever there have been great progressive impulses in this country, or in any country, even those countries with banking and currency systems having the high approval of our financiers, there have been sharp reactions. And so it will ever be. In the years of overconfidence prices set a pace too fast for legitimate growth and soon leave development far to the rear. There can be but one result. There comes a time when market prices and actual values must get closer together, and when that time comes the necessary process of readjustment hurts. Then comes the crisis, the panic, the depression—one or the other or all three in the order given. You cannot name a country that has enjoyed any great commercial development that has not had its panics, its crises, its periods of depression. And there never will be such a country, no matter what banking or currency scheme may be in use.

The American Rolling Mill Corporation Take Over the Continental Chain Company.

The American Rolling Mill Corporation, with mills at Muncie, Ind., Muskegon, Mich., and Sandwich, Ill., have purchased the Continental Chain Company, the works of whom are located at East Chicago. It will be remembered that the American Rolling Mill Corporation early this year increased their capital stock to $1,000,000. A considerable portion of the increased capital stock was sold for cash, but $250,000 has remained in the treasury. It is understood that the taking over of the Continental Chain Company was accomplished with the aid of a portion of the treasury stock. The capital stock of the Continental Chain Company was $60,000. The chain works will continue to manufacture a full line of railroad, agricultural wagon and foundry chain. The corporation announce that having this new plant in connection with their rolling mill will enable them to make a special iron for all requirements in the line heretofore manufactured by the Chain Company, but it is understood that other kinds of finished material will be produced eventually, it being the intention of the corporation to utilize some of the intermediate steel products which they have heretofore been selling in the open market. James E. Hubbert of Hubbert & Hubbert and president of the Continental Chain Company has taken an interest in the corporation and will in future devote his entire time and energy to the interests of the American Company.

Among the recent arrivals in this country on a tour of inspection of its industries is Max Huelsenbeck, chief engineer of the Helios Electrical Company of Ehrenfeld, near Cologne, Germany.

The Iron Age

New York, Thursday, August 28, 1902.

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The United States Steel Conversion Plan.

A good deal of welcome light is shed upon the plan of converting a part of the preferred share capital of the United States Steel Corporation by the affidavit made during the past week by George W. Perkins of J. P. Morgan & Co., the chairman of the Finance Committee of the corporation. While the vast majority of the stockholders have assented to the plan, their approval as the partners in interest being the really vital point, yet the operations of the *haute finance* are of such general public concern, and they touch the iron industry so closely, that a discussion of its features is appropriate.

The one matter which strikes one in connection with the whole transaction is the tender solicitude for the holder of the common stock. The possessor of preferred stock was virtually assured a little more than a year since that the advantages secured through consolidation would guarantee him 7 per cent. interest on his holdings. In a surprisingly short time he was asked to surrender a part of that income and consent to having an additional prior lien put on the property, receiving as a consideration therefor a security labeled "bond." The owner of this preferred stock knew that he had purchased a somewhat speculative security, and he relied rather upon the earning capacity of the corporation than upon the foreclosure value of the property to protect his principal. He is now told that the proposed issue of $250,000,000 bonds will be extinguished by sinking fund operations in 60 years, which happens to be, according to Mr. Schwab's testimony, the life of the iron mines which he, as president of the corporation, values at $700,000,000. We presume that before the expiration of that period the $304,000,000 of Carnegie bonds will also be retired, since both issues together would not cover exhaustion of mineral property alone.

Mr. Perkins states that the new company took over from the constituent companies obligations for purchases and improvements calling for $15,000,000 to $20,000,000, the existence of which must have been known when the policy of paying dividends on the common stock was decided upon. The future was far less brilliant then than it is now, yet dividends were declared because there was supposed to be a moral obligation to holders of shares of constituent companies who were paying dividends at the time of the consolidation. The force of that argument is somewhat weakened by the fact that the owners of the shares of such constituent companies received a very substantial bonus in the exchange of securities. The National Tube preferred stock was given for each 100 shares 125 shares of new preferred and 8.80 shares of common stock, while National Tube common was exchanged for 125 of United States Steel common. The American Tin Plate Company fared even better, the preferred receiving 125 of new preferred and 20 of new common and the old common 125 of the United States Steel common stock. While the stockholders of some of the constituent companies may have then believed and may still think that the bargain was not a favorable one for them, they certainly escaped some very serious dangers through the formation of the United States Steel Corporation. They may have expected a continuance of dividends on common stock, but hardly had a moral right to them. In view of the fact that the new company were committed to expenditures for purchases and improvements of sums aggregating $15,000,000 or $20,000,000, it would have been safer to have withheld payments on common stock, particularly since the outlook at the time when they were declared did not by any means disclose the brilliant developments in the industry which have since followed.

According to Mr. Perkins' statement somewhere between $20,000,000 to $25,000,000 are needed for further improvements. What they are the trade can only surmise, but enough is proved by the course of events to judge that the expenditures are to be made for new equipment and plant. If the outlay of $40,000,000 is to lead to an enlargement of annual profits by $10,000,000, which would benefit principally the common stock—the earnings being large enough to place the payment of the full dividend on the preferred stock beyond a doubt—it would appear only fair that the common stock should forego a year's returns even now. It must be taken into account that these improvements cannot be completed in one year, so that the payments for them would extend over a considerable period. On the other hand, it is true that the returns from them in the shape of larger profits would not come in until well after their completion.

The iron trade has watched developments with the keenest interest, since the future of every man identified with the industry is in a considerable measure bound up with the success of the corporation. It has long been an axiom that management is the keynote to success, that it may triumph over serious natural drawbacks or ruin splendid natural advantages. Management embraces three great departments, the commercial, the manufacturing and the financial. The trade is probably best qualified to judge of the first and, broadly speaking, there is but one voice in regard to it. During the present boom the managers of the United States Steel Corporation have done what every ironmaster has in past similar periods urged should be done—by the other fellow. They have kept prices within bounds to the extent of their great power and have protected the consumer.

The management of the manufacturing end comes within the range of internal affairs which the trade has comparatively little opportunity to study. It is well known, however, that splendid work has been done in the direction of improving practice and in equalizing costs to a much lower average.

The financial management speaks for itself.

The Losses Through the Anthracite Coal Strike.

From week to week there are published estimates of the cost of the anthracite strike which make a brave showing and look decidedly complete and fair. The loss of wages to the men is figured out, which we suppose may be done pretty closely. We are told how many millions of dollars the coal companies and the railroads lose in profits, which may or may not be wide of the mark. Quite a display of millions is made over the loss of business of local merchants and other incidental matters. Now all these statistics are based on the assumption that every ton of anthracite coal not mined during the strike represents just so much total loss, and this, in the face of the fact, only too well known, that the one

serious feature of the anthracite coal mining industry is that the men are employed less than 200 days in the year, and that the capacity for production of the collieries is greatly in excess of the demand. In other words, the strike is causing idleness, which would have occurred in any case, and when the mines do start up they can and probably will produce a good deal of the coal on which our statisticians figure such great losses.

The anthracite coal industry has had serious losses during the struggle. Every ton of bituminous coal burned by consumers who ordinarily use anthracite is business lost, with the chance that some customers may have been taken away forever. But the great mass of the requirements is simply in suspense, and this is particularly true of the domestic demand, which will not be seriously felt for some time to come. Instead of entering the winter with enormous stocks, as usual, the anthracite trade will have many months of work at maximum pressure, and will have then to fill the yards and storage plants so utterly depleted.

The sacrifices which the manufacturing industries, and notably the Eastern iron trade, have been forced to make, are serious enough and the anthracite mining industry must suffer keenly, but it is ridiculous to parade the huge figures which the amateur statisticians are putting forward. They absurdly exaggerate the situation and contribute to the feeling, only too prevalent, that a great industry and all those connected with it have been seriously crippled.

The Car Problem and Old Material.

The solution of the car problem continues to be of great interest in the Central West. During the past week five or six of the trunk lines centering at Chicago have announced the intention to scrap many, if not all, of the 20-ton cars returned to the railroads recently in accordance with the provisions of the car bureau service, to which we referred two weeks ago. It is estimated that about 15,000 cars—12,500 of which are already accounted for—will be scrapped at Chicago alone within the next 60 days, yielding about 100,000 tons of various kinds of iron and steel, each car, according to dealers, yielding 4 tons of steel and wrought iron scrap and 3 tons of cast and malleable iron scrap. Of the railroads already heard from, the Baltimore & Ohio has 2200, the Santa Fe 2500, the Chicago, Burlington & Quincy from 1000 to 3000, the L. E. & W. 800, the Big Four 1000, and the Illinois Central is believed to have from 1000 to 3000 cars at Chicago to be wrecked.

The trunk lines are reported to be willing to dispose of some of these 20-ton cars, with the provision that they shall be used for local traffic alone and not delivered to the trunk lines hereafter upon any conditions. While a few such cars will doubtless be absorbed by private car lines for local traffic, the majority of the minor railroads throughout the country will be compelled to have larger and stronger cars for long hauls.

While it is known that many of the more important Western railroads have secured new equipment since the car famine of last year, it seems to be doubtful that the new rolling stock will be ample to cover the cars that are about to be wrecked. It is true, however, that under the per diem rate and penalty system now in force the trunk lines will be able to obtain much better and quicker service from rolling stock, which will, in large measure, compensate for the loss of the 20-ton cars.

The full effect of the present revolution in car equipment cannot be determined for a month or so, when both east and west bound traffic will be at its hight. Thus far the experience at Chicago is that west bound is larger than east bound traffic, in spite of the fact that the east bound tonnage continues to increase. The prolonged coal strike in Pennsylvania and the depleted corn stocks in the West are reflected in the volume of business. The tonnage, as a whole, however, is nearly, if not quite, as large as at this time a year ago. Should operations at the mines in Pennsylvania be resumed in October or November, when grain and general merchandise are being most actively distributed, the capacity of the carriers throughout the country will be taxed to the utmost to move promptly the tonnage offered. Then will come the crisis.

The fact that 100,000 tons of iron and steel scrap are in sight at Chicago alone is proving to be an important factor in the market for old material. Thus far there has been little more than a moral influence, as scarcely any of the iron and steel to come from the wrecked cars will be available until October. The consumers of such material, however, especially the rolling mills in the Central West, are disposed to anticipate lower prices. For several months scrap iron and steel have steadily advanced, while bar iron has been sold at relatively lower prices than ever before. Even now, with a better understanding among the mills, resales of bar iron are being made under 1.80 cents. The outlook for the mills, however, is brighter than for the past two or three months.

PERSONAL.

J. Schoenawa, the superintendent of the steel works, and Vorwerk of the blast furnace department of the Roechling Works, Voelkingen, Saar District, Germany, have arrived in this country to inspect some of our leading plants.

J. W. Smith has resigned his position with the West End Rolling Mill Company of Lebanon, Pa., to go to Pittsburgh. Since Mr. Smith took charge of the mill early in the year its capacity has been doubled.

Edgar S. Cook, president of the Warwick Iron Company, Pottstown, Pa., has returned from a prolonged tour in Europe for the sake of his health.

Frank Klepetko, for many years connected with the management of the Tamarack and Boston and Montana Copper companies, has resigned to establish himself as consulting engineer in New York. It is reported that he will be the consulting engineer of the famous Cerro de Pasco copper mines of Peru, in which J. B. Haggin and others are interested.

A. Toledo of the City of Mexico is at present in the United States making arrangements to handle American machinery in Mexico.

Ernest F. Dubrul of the Miller, Dubrul & Peters Mfg. Company, Cincinnati, Ohio, has been appointed commissioner of the National Metal Trades Association, with supervision of labor troubles and strikes.

John Crerar has been elected a director of the Republic Iron & Steel Company to succeed Randolph S. Warner, who resigned.

Frank Samuel of Philadelphia was a passenger on the "Kronprinz Wilhelm," which arrived in New York last week. Mr. Samuel visited most of the leading iron centers in Great Britain and on the Continent, and is not favorably impressed with the prevailing conditions, except so far as the American market may help them out.

J. G. Butler, Jr., the well-known pig iron manufacturer of Youngstown, Ohio, and also chairman of the Bessemer Furnace Association, has gone to the Pacific slope for an extended trip.

Don Bacon, president of the Tennessee Coal, Iron & Railway Company, is expected to return from England this week. It is probable that then the negotiations for

the sale of the Sheffield furnaces to the United States Mining Company may soon be consummated.

J. C. Osgood, president of the Colorado Fuel & Iron Company, states that the vice-presidency of the company has been offered to George L. Reis, superintendent of the Milwaukee works of the Illinois Steel Company.

Frank J. Hearne has resigned as president of the National Tube Company. William B. Schiller, who has been first vice-president, succeeds him.

Notes from Great Britain.

American Purchases.

LONDON, August 16, 1902.—In my notes last week I gave the exports of pig iron to America during the month of July as 52,192 tons. On subsequently examining the figures I find that the exports during the same month from Barrow to America were not included. These amounted to 7250 tons, making the complete total 59,442 tons. On the whole, I think it may be said that American demands on this side of the Atlantic are slackening. A curious side light on this is found in the increased keenness of German competition in the British market. This is ascribed to the falling off in the American demand which, earlier on, absorbed whatever surplus the Germans had to sell. Shipments now going to the States are, of course, in fulfilment of orders long since placed.

The Market.

Neither buyers nor sellers quite know how the market cat is going to jump, and the consequence is timidity all round and a lack of buoyancy. There is a suppressed belief that things will brisk up in the autumn, but it is idle to ignore the plain fact that expectations have not been fulfilled. The South African market has proved distinctly disappointing, while the renewal of German and Belgian competition is being felt. The Germans are selling steel in the British market at prices which British makers will not look at. *Per contra*, pig iron prices are stiffening, and so are freights. The Scotch bar iron makers have advanced their list price by 5 shillings per ton, the basis quotation being £6 15s. less 5 per cent., for crown bars. The reason adduced for this is the high cost of raw material. The makers explicitly state that there is not any actual improvement in business. Indeed, many Scotch works are on short time. Marked bar makers maintain their prices and are well occupied, but unmarked bars are not in such good demand, and are selling at £6 12s. 6d., or perhaps slightly less. Sheet makers are getting better prices, and as a matter of fact galvanized sheets are selling at £11 5s. in the Midlands, and from £11 7s. 6d. to £11 10s., 24 gauge, f.o.b. Liverpool.

Pig iron manufacturers state that none of their make is going into stock, but this is, of course, due to the fact that the output continues to be restricted to actual trade demand. With raw material so dear they cannot make for stock and so lock up their capital and run the risk of the market being glutted and prices slaughtered. The shortage, therefore, of pig iron leads to a more or less artificial demand for made iron, and in this way prices are maintained. The Scotch steel makers are busy and maintain prices, ship plates being £6 per ton, less 5 per cent., angles £5 12s. 6d. In the Midlands the following are the standard prices: Pig iron: Forge qualities, Staffordshire cinder, 51 to 52 shillings; part mine, 53 to 55 shillings; all mine, 57 shillings 6 pence to 67 shillings 6 pence; best ditto, 77 shillings 6 pence to 80 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 52 to 53 shillings; Derbyshire, 53 to 54 shillings; North Staffordshire, 54 to 55 shillings. Finished iron: Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 12s. 6d. to £6 15s.; North Staffordshire bars, £6 15s.; angles, £7 10s. to £7 15s.; sheets, singles, £7 12s. 6d. to £7 17s. 6d.; doubles, £7 15s. to £8; trebles, £8 7s. 6d. to £8 12s. 6d.; galvanized corrugated sheets, f.o.b. Liverpool, £11 5s. to £11 10s.; hoop iron, £7 5s. to £7 10s.; nail rod and rivet iron, £7 5s. to £7 10s.; gas strip, £7. Steel: Bessemer billets, £5 to £5 2s. 6d.; best Siemens billets, £5 5s. to £5 7s. 6d.; mild steel bars, £6 10s. to £7; steel plates, £6 10s. to £7 10s.; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 5s. Other quotations for pig iron are: Scotch, 56 shillings 2 pence; Cleveland, 51 shillings 8 pence; hematite, 60 shillings 1 penny; spelter, f.o.b., £18 12s. 6d.

Ships Sold to Other Nations.

Structural steel manufacturers will be interested in knowing the final destiny of their products. I therefore subjoin a complete statement of ships made by British makers and sold to foreigners during the month of July, giving ship's name, port at which built, destination and flag:

	Tonnage.
"Alwina," Greenock, Rotterdam, Dutch	1,555.45
"Ama Begonokoa," Dumbarton, Mintevideo, Uruguayan	2,516.33
"Barone Edmondo Vay," Londonderry, Lussin Piccolo, Austro-Hungarian	2,893.75
"Arvor," Ardrossan, L'Orient, French	401
"Bacchus," Port Glasgow, Genoa, Grecian	3,071
"Como," West Hartlepool, Rio de Janeiro, German	5,137.38
"Fedor Tschishoff," Glasgow, Archangel, Russian	760.62
"Frithjof," Selby, Yorkshire, Hong Kong, Norwegian	1,389
"Gamen," Blyth, Stockholm, Swedish	2,585.95
"Holland," South Shields, Rotterdam, British	452
"Nederland," Middlesbrough, Rotterdam, Dutch	3,830.28
"Rossija," Newcastle, Constantinople, German	3,983.16
"Taurus," Campbelltown, Bergen, Norwegian	1,238.56
"Wermland," West Hartlepool, Helsingborg, Swedish	2,326
"Wobun," Greenock, Pictou, N. S., British	1,551.12

Shipbuilding Points.

Two interesting facts in connection with shipbuilding have developed this week. In the first place the British Admiralty have given out their contracts for repair work. The policy announced is to let private contractors do these repairs, and so leave the royal dock yards open for two or three years for the specific purpose of increasing the fleet with new boats. The Fairfield Company will receive the "Diadem" and the torpedo destroyer "Fairy." The "Aurora," an armored cruiser of the "Australia" class, is to be modernized by John Brown & Co., Limited. Vickers Company get two vessels, the protective deck cruiser "Niobe" and the torpedo destroyer "Leopard." Harland & Wolff of Belfast will completely overhaul the second class cruiser "Hermes," while Lairds of Birkenhead will devote their attention to the torpedo boat destroyer "Lynx." Palmers will make considerable additions to the gun power battle ship "Howe" and will otherwise repair her. The battle ship "Colossus," built in 1886, will be taken in hand by the Thames Iron Works. J. S. White & Co. of Cowes will perform a similar service to the torpedo destroyers "Teazer" and "Dove."

The second point relates to liquid fuel. In *The Iron Age* of July 31 there is an article on the subject of liquid fuel in the manufacture of pig iron. That liquid fuel is going to have a future it would be bold to deny. On this point I subjoin some experiments made by the German liner "C. Flaiesz," which recently made a trip to the far East at a mean horse-power of 2200. Her oil consumption per horse-power per hour has been 1.4 pounds, while on a corresponding trip with ordinary fuel the consumption was nearly 40 per cent. more, or 1.93 pounds. In the case of vessels fitted with the Howden system of heated draft the consumption under both conditions is very much less. Using coal and on an extended trip the consumption was a trifle under 1½ pounds per unit of power per hour, while with oil fuel in the same boilers it was 1.065 pounds. This result, however, has been almost equaled in the case of a ship fitted with the Orde-Armstrong system, the oil consumption having worked out at 1.08 pounds. It would thus appear that, provided oil can be got as conveniently as coal at any point of the voyage, and that its price does not exceed by more than 30 per cent. the cost per ton of coal, economy must result from the use of oil.

Railway Results.

At this time of the year the results of railway working for the past year have been collated. The following brief analysis of the complete figures for Great Britain may therefore prove useful to American railway engineers for purposes of comparison:

The length of line opened for traffic at the end of the 12 months ended June last was 22,078 miles, as compared

with 21,855 miles a year earlier. The paid up capital keeps on rising. In the year it increased by £19,562,000, the total now being £1,195,564,000. In 1891 the amount was £919,425,000. Passenger receipts reached £46,630,000, against £45,384,000, and goods receipts £52,966,000, against £53,471,000. Earnings from all sources were £106,559,000, against £104,802,000, while the ratio of expenses to receipts was 63 per cent. as compared with 62 per cent. The net revenue was equal to 3.27 per cent. on the paid up capital, this comparing with 3.41 per cent. for the previous period, 4 per cent. for 1891 and 4.29 per cent. for 1881. An analysis of the reports of the leading English railway companies for the half year to June shows that few of them were helped materially by their passenger earnings, but from goods, materials and miscellaneous sources the companies did well enough.

Some Dividends.

The report of the consolidated firm of Guest, Keen & Nettlefolds shows that the profits for the period ended June 30, 1902, amount to £447,204, made up of 12 months' trading of Guest, Keen & Co. and 15 months' trading of Nettlefolds. To this must be added the amount brought forward from last year, £110,843, making an available balance of £558,047. Deducting from this the debenture interest, interim dividends on preference and ordinary shares, &c., there remains a sum of £370,369, which the directors recommend should be appropriated as follows: To payment of a dividend on the preference shares at the rate of 5 per cent. per annum, free of tax, for the six months ended June 30, 1902, £43,000; to payment of a dividend on the ordinary shares at the rate of 10 per cent. per annum, free of tax, for the six months ended June 30, 1902 (making 10 per cent. for the year), £48,250; to carry to reserve, £150,000, and to carry forward a balance of £129,119. For the year ended June, 1901, a dividend of 10 per cent. was paid, £150,000 was placed to reserve, and £110,843 carried forward. Since then the company have absorbed Nettlefolds, who paid 20 per cent. dividends in 1900 and 1901 and had a reserve fund of £240,000.

The Midland Railway Carriage & Wagon Company, Limited, report a profit of £44,230, and pay a dividend at the rate of 6 per cent. per annum on the preference shares and 7½ per cent. with a bonus of 10 shillings per share on the ordinary shares. This means a dividend on ordinary shares for the whole year of 12½ per cent. Up to now this company have declined to amalgamate with the large combine which I reported some months ago. On this point the chairman of the company remarks that the combine have certainly not increased competition. They regard the whole question, however, with an open mind and if pushed would, I think, amalgamate.

Indian Demand and Output.

The report on the trade of India for the year ending last March by Mr. O'Connor is full of interest to those who, like myself, have consistently urged commercial exploitation of this country, so rich both actually and potentially. The Belgian iron and steel sent to India are of inferior quality and much cheaper than that supplied from Great Britain. The following figures show exactly the extent of the trade done by India with Great Britain and Belgium:

	United Kingdom. Tons.	Belgium. Tons.
Iron bars	8,550	30,931
Steel bars	5,991	35,108
Sheets and plates: Iron	2,549	6,769
Steel	13,503	16,536
Iron, galvanized	43,746	197
Iron, tinned	11,532	....
Hoop iron	2,913	1,648
Hoop steel	11,455	1,603
Angle, bolt and rod iron	1,952	8,561
Angle and channel steel	6,734	3,012
Beams, pillars, girders, &c.: Iron	3,495	4
Steel	7,598	11,281
Pipes and tubes, iron	15,002	196
Nails, screws, rivets, &c., iron	3,073	3,481
Other sorts of iron	21,472	1,275
Other sorts of steel	6,581	23,154
Totals	166,146	143,756

Importations of railway material on private account are not particularly encouraging, but this may be explained by the increasing mileage constructed and maintained by the State itself. Importations of material by the State were large, amounting to nearly $12,000,000, while for private companies the figures slightly exceeded $5,000,000. On the question of the Indian Government purchases an interesting paper has been issued, showing correspondence between the various British locomotive firms dealing with the competition between German and British manufacturers of railway locomotives. The correspondence was started by a letter from the Secretary of State for India, inclosing formal acceptances for tenders of locomotives. The letter sent by the secretary, after stating that the delay in accepting the tenders was due to a very serious doubt as to the right decision, says he received, from a firm of German manufacturers of the highest standing, tenders which, in respect of the passenger engines required, were more than 20 per cent. below British prices and, in respect of the goods engines, nearly 20 per cent. below. The date of delivery was, in respect of the passenger engines, 25 weeks earlier; and in respect of the goods engines, 13 weeks earlier than that which British firms named. Dubs & Co., the well known Glasgow engineers, who received the letter, promptly called together their fellow manufacturers. The response they made after consultation with their colleagues covered a number of points, one of the most important being that the German firms estimated to use much cheaper materials, while their standard of workmanship and finish are much below their British competitors. In these circumstances it is naturally contended that the tenders were not fairly comparable, the British tender being for one class of locomotive, very costly to make, while the German tender was for another and lower class of locomotive, cheap to make and therefore cheap to buy. The Indian Government's reply to this communication contains in polite language a very serious warning. I quote part of it:

"His Lordship desires me to observe that as to the advantageous nature of the German tenders in respect of price and of the promise of early delivery there can be no question. On the other hand, he has certainly no wish to dispute the allegation that German work is inferior to British work in this particular line of manufacture, but this inferiority has not yet been proved by actual experience in India, still less has it been proved to be so great as to outweigh the very material advantage in point of cost and of the prospect of speedy delivery which would be gained by the acceptance of the foreign tender. He cannot avoid the conclusion that unless this difference in price and in the time required for the execution of orders is fully compensated for by the superior quality and durability of the article supplied, the possibility of confining orders for Indian locomotives to this country will be seriously imperilled."

Two final notes may be added to the foregoing points upon India. The number of coal mines in operation rose from 286 in 1900 to 427 in 1901. The Bengal production amounts to four-fifths of the total Indian output, a great stimulus being felt on account of the higher prices in India, following the rise of the price in England. Since 1897 the output for all India has risen from 4,066,294 tons to 6,635,727 tons. The second point is that Mr. Tata, an Indian gentleman, is now in England, and will shortly be visiting both America and Germany, in connection with a concession he has obtained for working extensive and rich iron ores in the Lohara and Pepulgaon districts of the Central Provinces. It is stated on his authority that experiments for smelting iron ore in those districts, made some years ago, failed owing to the instability of the locally produced coal for coking. It is now stated that the difficulty as to smelting has been overcome, and that experts are agreed that when the industry is organized in the Central Provinces the mines there will be second to none throughout the whole world. Limestone is available to an unlimited extent, while all the necessary assembling is within easy reach of the iron

ores. An attempt is being made to form a syndicate with a capital of over $3,000,000, and it is expected that a daily output of 300 tons of steel will be procurable.

S. G. H.

Trade Publications.

Machine Tools.—The R. K. Le Blond Machine Tool Company of Cincinnati have issued a catalogue describing their engine, turret and stud lathes, sliding bed gap lathes, universal milling machines, &c. Their standard lathe apron is of the geared type, doing away with worm and worm wheels. All the feeds are reversed in the apron, and arrangements are made for dropping the rack pinion out of the rack, also for preventing the simultaneous engagement of the rod and screw feeds. All the gears are cut from the solid and the pinion gears are made from steel. All the studs are hardened and ground. Their taper attachment is of new design and is very rigid. It is changed from straight to taper work by simply moving a taper pin from one hole to another. The cross feed nut is never disconnected, and the compound rest can be moved by the screw when turning both straight and taper work. When extra heavy work is done the compound rest can be clamped to the taper attachment by a brace. By this arrangement all thrust is removed from the screw, insuring greater accuracy. The guide bar is graduated to taper per foot, and is clamped in position by two T slots. A graduated screw adjustment is provided for accurately setting the bar. When desired their regular engine lathes are provided with a turret on the carriage, which is made to interchange with the compound rest. This turret is fitted with their patent locking pin, having a bearing on both sides of the locking ring, and is adjusted with a taper gib. All play and wear can be instantly taken up.

Chucks.—The Skinner Chuck Company of New Britain, Conn., in their 1902 catalogue describe their lathe drill, planer and special chucks. Their 1901 pattern independent lathe chuck is the result of years of experience in manufacturing chucks of this class. It embodies all the good qualities of the earlier patterns as well as important improvements which now appear for the first time. The design is pleasing and such as to insure strength, and the chuck is so nicely balanced that it may be run at any desired speed without fear of injury to the finest machinery. The jaws are made with a full nut from steel dropped forging, and are reversible in all sizes. They are ground on the steps in the chuck after having been case hardened. To reverse the jaws they are run off the screw at the center and turned end for end. The fine thread on the jaw screws gives this chuck a more powerful grip than is found in other makes. It is also furnished with solid reversible jaws, unless otherwise specified. Their universal geared scroll chucks are made with three or four jaws, and in sizes from 2 to 15 inches. In their universal lever scroll chucks the power is applied directly to the scroll plate by a lever of suitable length or by hand in the smaller sizes.

Compressed Air in the New York Subway.—The Rand Drill Company, 128 Broadway, New York, have prepared a very handsome pamphlet of large size, copiously illustrated, showing the use to which compressed air is put in the subway now building in New York City. It is divided into parts treating, first, of the necessity for rapid transit in New York and its early history, and a general description of the subway itself and what it is expected to accomplish. Then follows an account of the part played by compressed air in carrying forward the work. While the scheme originally contemplated the construction of compressed air plants of large capacity and from which the power would be supplied to the subcontractors, this was abandoned and each contractor installed his own plant. There was need for power to run the cable ways, hoisting engines, rock drills, pumps, &c. This power, in some cases, was for a time supplied by steam boilers located at various points of proximity to the work, but afterward compressor plants permitted a concentration of these boilers at convenient points for fuel facilities, &c. Then again the adaptability of the air plant to the modern riveting machine, the rock drill, pumps, hoisters, &c., was a strong argument in its favor. The various sections of the tunnel are briefly described and the outfits mentioned in detail.

Kerosene Engines.—A pamphlet of the New York Kerosene Oil Engine Company, 31 Burling slip, New York, describes their kerosene oil motors. These engines have been thoroughly tested in actual practice and have been used with the highest satisfaction both in this country and abroad. For these engines the claims of absolute safety, great economy, simplicity, and even running are made.

Pipe Tapping Machines.—A catalogue by the A. P. Smith Mfg. Company of Newark, N. J., deals with pipe fitting machines for making valve connections and for inserting corporation cocks, and also with their standard compression fire hydrant, with sliding frost case. The Smith tapping machine has been pronounced a most serviceable and economic water works tool by eminent hydraulic engineers, and is made in four sizes, which embrace all cast iron pipe sizes from 2 to 48 inches inclusive. With these machines connection can be made with water, oil, gas or steam mains, without reducing the pressure of any size not exceeding the diameter of the main.

The hammer tube cleaner, manufactured by the Coggeshall Mfg. Company, 136 Liberty street, New York, removes the scale from the outside or water side of the tubes in tubular boilers by rapping on the inside. It can be operated by hand or compressed air. The blow of the hammer is light and rapid, and it does not injure the tubes. With this device a boiler can be cleaned in a few hours.

Blowers.—A comprehensive catalogue by the American Blower Company of Detroit, Mich., considers their "A. B. C." pressure and volume blowers, which are composed almost entirely of steel. The housing of the pressure blower is of heavy annealed steel plate, so proportioned to the other parts as to give the maximum efficiency. The blast wheel is very strong and easy running. The hub and spider are of malleable iron and the blades and side plates of steel plate closely cold riveted with Norway rivets. Every wheel is accurately balanced before being mounted, insuring smooth running even at very high speeds. All the bearings of these fans and blowers are self aligning and self oiling, with large bearing surface, the length of the journal being over five times the diameter of the shaft. Both the boxes are closed with plugs, which center the shaft and prevent oil from running out at the end. The inner end is provided with a ring in the casting of the box, which retains the oil. These blowers are furnished with either one or two pulleys, to comply with the requirements, and are designed especially for cupola work. These blowers are made in capacities from 300 to 8500 cubic feet per minute, and at pressures of 5 to 16 ounces.

The American Air Compressor Works, 26 Cortlandt street, New York, have prepared a very neat catalogue in Danish for the use of their agent, Kay Dyhe, of Copenhagen, Denmark. Descriptions are presented of their air lift pumping system, and a few of the American air compressors and governors. It also contains descriptive list and cut of the direct acting air compressor manufactured by the Union Steam Pump Company.

A report just issued from Washington by the Census Office shows a capital of $40,813,793 invested in the manufacture of locomotives in the 28 locomotive works reporting for the United States in 1900. This represents the value of land, buildings, machinery, tools and implements and the live capital utilized, but does not include the capital stock of any of the manufacturing corporations engaged in the industry. The value of the products is returned as $35,209,048, to produce which involved an outlay of $10,899,614 for wages, $1,369,341 for miscellaneous expenses, including rent, taxes, &c., and $20,174,395 for materials used, mill supplies, freight and fuel.

Reports from Uniontown, Pa., state that the large demand for coke is stimulating development all over Southern Fayette County. Taylor Brothers are said to be arranging to open up a 400-acre tract, build 100 ovens and 2 miles of railroad, near Searights. John C. Neff and others have taken out a charter for a railroad to cost $120,000, and will spend $250,000 in developing a 550-acre tract near New Salem, with two coke plants, aggregating 500 ovens. The Shamrock Coke Company are building 50 ovens, the Oliver & Snyder Company are sinking a new shaft and building 300 ovens, and the Leckrone Coke Company of Uniontown are building 50 ovens.

A night class will be formed at Cooper Union, New York, for the study of naval architecture, beginning on September 22. It will be under the direction of Alexander J. Maclean, professor of naval architecture at Webb's Academy. Application may be made in person or by mail at the office of Cooper Union. Applicants should be familiar with elementary algebra and geometry.

The Dominion Iron & Steel Company of Sydney, N. S., have ordered their fourth blast furnace lining from the Portsmouth & Kentucky Fire Brick Company of Portsmouth, Ohio, of whom they have also ordered several cargoes of steel works brick.

Reports which lack confirmation are current to the effect that C. H. Halcomb, who recently retired from the presidency of the Crucible Steel Company of America, is to build a new crucible steel plant in the vicinity of Buffalo.

MANUFACTURING.

Iron and Steel.

The Empire Steel & Iron Company, Catasauqua, Pa., have just completed extensive repairs to their Greensboro furnaces, N. C., and hope to get them in blast some time in September. The company have a large deposit of ore at Wilson Mills, N. C., from which place the Greensboro furnaces will draw their supply.

At the recent annual meeting of the Highland Iron & Steel Company, Terre Haute, Ind., the following officers were re-elected: Philip Matter, president; J. L. Smith, vice-president; W. M. Meyers, secretary; W. C. Ely, treasurer and general manager.

The Chateaugay Ore & Iron Company, Plattsburgh, N. Y., will rebuild Standish Furnace, and expect to have it completed next year. The furnace will be 60 x 12 feet, with three fire brick stoves, and will have a capacity of 100 tons of charcoal iron per day. The work is under the direction of F. C. Roberts & Co., Philadelphia, and the equipment will be furnished as follows: Southwark Foundry & Machine Company, Philadelphia, the blowing engine; the Stirling Company, Chicago, boilers; Rarig Engineering Company, Columbus, Ohio, furnace and stove shells and iron work, and the Portsmouth & Kentucky Fire Brick Company, Portsmouth, Ohio, the linings.

Peninsular Furnace of the Peninsular Iron Company, Detroit, Mich., which has been idle for nearly a year, has been leased for a term of years by the Peninsular Iron Mfg. Company, Limited, who are thoroughly overhauling it, preparatory to going into blast in about 30 days. The stack is 42 x 9½ feet, and has a capacity of about 30 tons of charcoal iron per day. Solon Burt is secretary and manager.

The Alleghany Ore & Iron Company, Clifton Springs, Va., and New York, have purchased Buena Vista Furnace, Virginia, from the Virginia Iron, Coal & Coke Company. The stack is 70 x 16½ feet, and has an annual capacity of 54,000 tons of foundry and chill cast basic pig iron.

One of the National Steel Company's furnaces at Sharon, Pa., was damaged by an explosion August 24. It is stated that the stack has been forced to close down and will have to be partially relined.

The organization of the Empire Iron & Steel Company, who are building a sheet plant at Niles, Ohio, has been completed by the election of the following officers: Wade A. Taylor, president and treasurer; Charles S. Thomas, vice-president and manager, and Jno. F. Odea, secretary.

The United States Wire & Nail Company, Pittsburgh, Pa., have voted to increase their capital stock from $200,000 to $300,000, to provide a larger working capital, as the company have made a number of improvements to their plant at Shousetown and have branched out into a number of new lines.

The Chester Iron & Steel Company started up their plant on Monday last, after a two weeks' idleness. The new facilities added will now allow the works to run both a day and night shift. The plant is rushed with orders.

The Sterlingworth Railway Supply Company, Philadelphia, have purchased a plot of ground adjoining the Frankford Forge Works, at Eddystone, Pa., and will soon award the contract for a large steel structure to be erected thereon.

General Machinery.

C. D. Marsh & Co., Williamsport, Pa., manufacturers of wood working machinery, have purchased the plant of F. Stutzman, which they expect to enlarge in the near future.

Work of rebuilding the shop of the Rochester Machine Screw Company, Rochester, N. Y., which was destroyed by fire early in the year, is being pushed as rapidly as possible, and it is expected that it will be in operation by October. The power is furnished by a 120 horse-power Westinghouse compound engine.

The Beloit Iron Works, Beloit, Wis., have built a large paper machine for the Riverside Fiber & Paper Company. The machine is a mammoth affair, 200 feet in length, and between 15 and 18 feet in hight. It is capable of being operated at very high speed, and with other improved equipment which is being added the Riverside Mill is assured of a great output.

Final papers have been passed and the International Pneumatic Tool Company of London, England, have been formally transferred to the Chicago Pneumatic Tool Company, Chicago, Ill. As stated in these columns recently, the factory of the newly acquired company will be consolidated with the plant of the Chicago company in London, which has already been started.

The C. O. Bartlett & Snow Company, Cleveland, Ohio, announce that they are now quartered in their new plant, where they have greatly increased facilities for the manufacture of hoisting and conveying machinery, cement outfits, &c., besides superior shipping facilities by both rail and lake. The plant consists of two large three-story brick buildings, with two elevators, a building for structural iron and boiler work, and one for manufacturing and dressing buhrstones, besides an abundance of yard room with steam derricks for handling heavy dryers, tanks, boilers and engines. The equipment throughout is modern, including improved machinery, air compressors, with pneumatic drills and hammers, all driven with a 250 horse-power automatic engine.

The Westinghouse Electric & Mfg. Company, Pittsburgh, have received orders from the Jessop Steel Company of England for a considerable amount of direct current apparatus, and from the Pittsburgh Valve & Fittings Company, Pittsburgh, for electrical equipment, including generators, motors and switchboards. Both of the purchasers are erecting new works, the former at Washington, Pa., and the latter at Barberton, Ohio.

The Pennsylvania Railroad Company have completed plans for the practical reconstruction of the Juniata locomotive shops, east of Altoona, Pa., that will increase the capacity 50 per cent. The reconstruction is already in progress and will be finished before the close of the present year. All of the departments of the plant are being added to, and by the beginning of the coming year at least 500 additional men will be given employment. One of the plans of the engineers is the erection of a new frog and signal department. At present the signal work for the company is largely done at the works of the Union Switch & Signal Company at Swissvale. The enlarged plant will be able to take care of all the new work necessary for the Pennsylvania lines, it is said, the additions increasing the output at least by 60 more engines annually.

Boilers, Engines, &c.

The citizens of Weiser, Idaho, have voted to issue $40,000 in bonds for an electric plant and water works, $33,500 of which will be used for the latter. Thomas E. Kelly is mayor and Stewart H. Travis, city clerk.

The July sales of the Allis-Chalmers Company, Chicago, include the American Steel & Wire Company, Pittsburgh, six pairs of vertical cross compound steeple type blowing engines, steam cylinders 46 and 86 x 60 inches, air cylinders 87 and 87 x 60 inches and two vertical low pressure long cross head blowing engines, cylinders 80 and 87 x 60 inches; Buffalo & Susquehanna Iron Company, Buffalo, N. Y., four pairs of vertical cross compound steeple type blowing engines, steam cylinders 42 and 80 x 60 inches, air cylinders 87 and 87 x 60 inches; Tonawanda Iron & Steel Company, North Tonawanda, N. Y., one vertical long cross head type blowing engine, cylinders 42 and 84 x 60 inches; Milwaukee Electric Railway & Light Company, Milwaukee, Wis., two vertical cross compound direct coupled engines, cylinders 28 and 60 x 48 inches; Lidgerwood Mfg. Company, New York, 18 x 36, 1890 frame Reynolds-Corliss engine; McCormick Harvesting Machine Company, Chicago, vertical cross compound direct connected Reynolds-Corliss engine, cylinders 15 and 32 x 36 inches; Griffin Wheel Company, Chicago, 16 x 42, 1890 frame Reynolds-Corliss engine; New Orleans Railway, New Orleans, La., two vertical cross compound direct connected engines, cylinders 38 and 80 x 60 inches; C. A. McDonald, Chicago, two 1890 frame tandem compound Reynolds-Corliss engines, cylinders 14 and 26 x 42 inches; Studebaker Bros. Mfg. Company, South Bend, Ind., 32 x 12 independent air pump and condenser; Thos. Kent Mfg. Company, Clifton Heights, Pa., 84 x 18 Reynolds vertical boiler; Madero & Rincon, Gallardo, Lagos, Mexico, 14 x 36 girder frame Reynolds-Corliss engine and a 14 x 12 air pump and condenser; Omaha Water Company, Omaha, Neb., one 20,000,000-gallon vertical triple pumping engine; San Antonio Water Company, San Antonio, Texas, one 50,000,000-gallon vertical triple pumping engine; Pennsylvania Railroad Company, two 438 horse-power Sederholm boilers, with main shell 96 inches in diameter by 16 feet long, working pressure of 150 pounds per square inch; Ptarmigan Mines, British Columbia, 14 x 18 single Riedler express compressor, driven by 14 x 18 slide valve engine; Cia Minera De Piedras Verdes y Amexas, Mexico, 8 x 10 double cylinder single drum hoist and a 50 horse-power class "A" locomotive type boiler; one 22 x 42, two 20 x 42, one 22 x 36, one 18 x 48 and one 26 x 48, 1890 frame Reynolds-Corliss engine, and one 22 x 42, one 18 x 42, one 14 x 36, one 10 x 30, one 20 x 42 and one 18 x 36 girder frame Reynolds-Corliss engine for shipment to different parts of the country.

Bids are asked until September 3 for engines, generators, &c., at the New York Reformatory, Elmira. G. L. Heins is State Architect, Albany, N. Y., and Charles F. Howard is president of the board.

The increasing business of the Whitlock Coil Pipe Company, Hartford, Conn., manufacturers of feed water heaters, condensers, coils and bends, makes it necessary for them to double the capacity of their plant, which has been running more or less night and day for a greater part of the last two years. They are planning an addition, about 86 x 135 feet, to their pipe bending shop, and later on they expect to erect a two-story addition, about 50 x 75 feet, to the heater shop.

Tonawanda, N. Y., will vote September 4 on a proposition to appropriate $30,000 for a new engine at the local pumping station.

The Pittsburgh Gage & Supply Company, Pittsburgh, are furnishing two 125 horse-power boilers to the Cadiz Electric Light & Power Company, Cadiz, Ohio, besides giving their power plant a general overhauling, and for the Sleepy Eye Milling Company, Sleepy Eye, Minn., a complete oil filtering system. The company have in press a new general catalogue of some 686 pages, which will be a complete exposition of illustrations, de-

scriptions and price-lists of general machinery and supplies. The book will be ready for delivery about September 1.

Foundries.

The Detroit plant of the American Shipbuilding Company of Cleveland, Ohio, have let contracts for the erection of a new foundry, 75 x 151 feet, of brick and steel, equipped with two cupolas, one 72 and one 42 inches, one 15-ton and one 40-ton electric traveling crane, and a smith and pattern shop, 49 x 172 feet, of brick and steel, three stories. The cost of the two additions complete will be about $80,000.

At the annual meeting of the stockholders of the Grand Rapids Malleable Company, held August 11 in the offices of the works at the Grand Trunk Junction, Edward Lowe, J. C. Holt, Henry Idema, L. H. Withey, Willard Barnhart and T. J. O'Brien were re-elected as the Board of Directors. It is expected that the board will later re-elect Edward Lowe as president, Henry Idema, vice-president; H. J. Hollister, treasurer; D. M. Ray, secretary, and L. C. Packham, manager.

The Poughkeepsie Foundry & Machine Company, Poughkeepsie, N. Y., have purchased a property of about 10 acres on the north side of the city for the purpose of removal of their plant from the present location, where it has been since 1831, and which is now in the heart of the city. The new location is bounded on one side by the Central New England Railroad and on another side by the Poughkeepsie & Eastern Railroad, which will give excellent shipping facilities. They contemplate building an up to date foundry, much larger than the old one, and are hoping to get a portion of it ready for occupancy before winter. Plans are now being prepared, and they will soon be in the market for some new foundry equipment.

The Wolverine Brass Works, Grand Rapids, Mich., will erect a one-story concrete foundry on their property on Kent street, which they expect to have ready for operation within 60 days.

Buildings and Bridges.

The Modern Steel Structural Company of Waukesha, Wis., will furnish $53,000 worth of structural material for the new building which Swift & Co. are erecting at Chicago. This and a number of big railroad bridge contracts have necessitated the temporary working of a night shift, and the company report plenty of work in sight for the next six months.

The bid of $57,500 of the Penn Erecting Company, Philadelphia, has been accepted for the erection of the pattern shop and storehouse addition to the steam engineering department, League Island Navy Yard. The structure will be 65 x 103 feet, two stories, of brick, stone, terra cotta and steel construction.

Fires.

The Bridgeport Tube Works, Norristown, Pa., were recently destroyed by fire. The loss is about $10,000.

The boiler shop of Robert Munroe & Son, Pittsburgh, Pa., was damaged $15,000 by fire recently.

By the explosion of two steel digesters in the Delaware Pulp Mills of the Jessup & Moore Paper Company, at Wilmington, Del., August 20, the plant was damaged to the extent of $35,000.

The plant of the Portland Iron & Steel Company, Portland, Maine, was destroyed by fire August 20. The loss is estimated at about $100,000.

The Fitzgerald Machine Works, Fitzgerald, Ga., were destroyed by fire last week, entailing a loss of $4000.

Hardware.

Irving W. Fox, Rochester, Minn., manufacturer of the Rochester and Clipper wood saws and Tornado tank pumps, is erecting a new shop, which will be double the size of his former building. He advises us that he has recently made shipments of his wood saws to North Carolina and New Mexico.

J. A. Harps Mfg. Company, Greenfield, Ohio, are now making the Never Fail oil and gasoline cans, formerly manufactured by Eugene Arnott, the inventor, and his brother, J. S. Arnott. Since taking over the business the working force has been largely increased, so that the output of cans is much greater than formerly. The demand, however, has kept up with the supply, and it looks as though a further addition to the company's facilities would become necessary.

Ohio Wringer & Lawn Mower Company, Springfield, Ohio, have been succeeded by the Ohio Wringer Company, who have just been incorporated with a capital stock of $15,000. The officers of the new company are George D. Leedle, president; M. R. Harris, vice-president and treasurer, and C. C. Leedle, secretary. George D. Leedle will be superintendent and general manager of the concern, and Mr. Harris will have charge of sales. The company will discontinue the manufacture of lawn mowers, and will hereafter devote themselves entirely to making wringers.

The Burns, Silver & Co., Bridgeport, Conn., manufacturers of cabinet hardware, will enlarge their plant by the erection of an addition, 35 x 50 feet, to the foundry, and an addition, 20 x 40 feet, to the boiler house. A new 150 horse-power boiler and engine will be installed, the former furnished by the Pacific Iron Works, Bridgeport, and the latter by the Rollins Engine Company, Nashua, N. H.

Johnston & Sharp Mfg. Company, Ottumwa, Iowa, have recently made extensive improvements in their factory, and now have double the floor space they formerly had. They have further added considerable new machinery. With these much-needed improvements the company will be able to keep up in good shape with the demand for their products and to furnish them more promptly than of late.

The L. & I. J. White Company, Buffalo, N. Y., have under way an addition to their factory, and also one to their office, which have been necessitated by the constant increase in the demand for their edge tools, machine knives, &c.

Miscellaneous.

Frank S. Betz & Co., manufacturers of surgical instruments, Chicago, are planning the construction of an addition to their factory at Summerdale, Ill. The building will be three stories high, with 100 x 400 feet ground dimensions, of mill construction, and cost $100,000. A small part of the building will be devoted to showing apparatus used by the medical profession in the treatment of diseases.

The John Clayton Plow Works, Minneapolis, Minn., whose plant was recently destroyed by fire, will probably rebuild in that city and not elsewhere, as reported.

The Inter-State Car Company, Indianapolis, Ind., have incorporated under the same name. Their plant has been in operation for several years under the management of John Groff, who is president of the new company. E. H. Darrach is treasurer.

The J. A. Fay & Egan Company and the Lane & Bodley Company, Cincinnati, Ohio, are planning the erection of a building upon the site of their Bond Hill factories for the benefit of the workmen employed. It will be a combined boarding-house and restaurant and will take the place of objectionable resorts which usually spring up in the vicinity of large manufacturing plants.

The Moore Plow & Implement Company, Greenville, Mich., have increased their capital stock from $15,000 to $25,000.

The Patton Paint Company, Milwaukee, Wis., are erecting a large plant in Newark, N. J., which will be equipped throughout with the most improved appliances.

OBITUARY.

SAMUEL KLOTZ, vice-president of the Riley-Klotz Mfg. Company, Newark, N. J., died at his country home, in Hackettstown, N. J., August 23, after a lingering illness. He was born in German Valley, N. J., February 29, 1844. During the Civil War he was a captain in the First New Jersey Volunteers and was afterward promoted to Major of the Second Regiment. He removed to Newark in 1869. In 1885 President Cleveland appointed him Collector of Internal Revenue for the Fifth District of New Jersey. He was president of the Fraternal Building & Loan Association and a director of several telephone and electric light companies. In 1892 he was appointed a member of the Board of Street and Water Commissioners. Major Klotz was also prominent in secret societies and other beneficiary organizations. He is survived by a widow and three children.

RICHARD LACEY, secretary of the United Copper Company, died on August 15, at his summer home, Quogue, L. I. Mr. Lacey was born in Middletown, Conn., in 1846. For many years he was engaged in the business of importing East India products. Some years ago he became interested in the copper business with his nephew, F. Augustus Heinze, and recently assisted in the organization of the United Copper Company.

ROY H. SMITH, the founder and principal owner of the Ithaca Gun Works, died August 15, at his home in Ithaca, N. Y., of cancer of the stomach. Mr. Smith was 56 years of age.

The Ontario Power Company will be allowed to construct a temporary cofferdam in the vicinity of Dufferin Islands, Canadian side, at Niagara Falls, in order that their construction work in connection with the development of power under their franchise may go rapidly forward. This permission has been granted by the Ontario Cabinet, Hon. Richard Harcourt, acting Premier, pointing out that the work, over which a dispute had arisen, would be of a provisional nature, the removal of which could be directed by the commissioners of Victoria Park at any time. A permanent structure will be placed inside the temporary work, and the latter must be removed not later than June 1, 1903.

The Iron and Metal Trades.

There has been no improvement in the handling of Coke by the railroads and the outlook for the furnaces which depend upon a distant supply is very discouraging. When fall movement begins seriously in grain and in general lines there promises to be a very general car shortage, which will be added to when the anthracite strike is over by the fact that much coal will have to be hauled by rail which usually goes to consumers by canal.

The scarcity of spot Pig Iron continues very acute and is only partially relieved by arrivals of foreign Pig Iron. After the recent rush to place orders for importation the market has quieted down somewhat, and we do not hear of any large transactions. For the time being the reports from the other side indicate a somewhat firmer market.

There has been less contracting for domestic Pig Iron for 1903 delivery, largely because the leading producers are avoiding further commitments.

In the Steel market interest centers on the developments in foreign Steel. During the recent break in foreign Billets some heavy sales were made in the vicinity of $27.50, ex ship, duty paid, both the seaboard and the interior markets taking some good sized blocks. There is further large inquiry, but buyers' views do not appear to be much above $27 or $27.25, at which business may be put through. These prices put the finishing mills in a somewhat better position as compared with the works who control material back to the Pig Iron or the Ore, or who are working on sliding scale contracts for Steel based on official Pig Iron prices.

The report has been going the rounds that a large modern shipyard on the Delaware has purchased 80,000 tons of foreign Plates and Shapes. It appears that the shipyard referred to has been investigating the question of building ships in competition with foreign yards and has secured options as a basis to bid for work, the foreign material of course being imported under drawback arrangements. The matter is interesting, as our Philadelphia correspondent puts it: "It may be that the day is not far off when the British flag will float over vessels made in America." Incidentally, it may be remarked that it throws a side light on the outlook for keeping the Atlantic Coast yards busy on domestic business.

The railroads continue to buy heavily in every branch of rolling stock and equipment. Further orders for Steel Rails have been placed and additional tonnage is in sight. It is stated that the associated mills now bave orders aggregating 1,150,000 tons for 1903 delivery The bridge builders, too, are booking tonnage. Two of the Western systems are now negotiating for an aggregate of 29,000 tons for 1903. In the lighter branches the fall trade, which ought to be felt now, is not yet in evidence in the expected strength and volume.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one month and one year previous.

	Aug. 27, 1902.	Aug. 20, 1902.	July 30, 1902.	Aug. 28, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$22.00	*$22.00	$22.00	$14.75
Foundry Pig No. 2, Southern, Cincinnati	*20.25	*20.25	20.75	13.00
Foundry Pig No. 2, Local, Chicago	*22.00	22.00	21.00	15.00
Bessemer Pig, Pittsburgh	*21.75	*21.50	21.75	15.75
Gray Forge, Pittsburgh	*20.75	*20.75	21.00	13.75
Lake Superior Charcoal, Chicago	*26.00	*26.00	25.50	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	31.00	31.00	32.00	24.00
Steel Billets, Philadelphia	28.00	28.50	28.75	26.50
Steel Billets, Chicago	29.60	31.00	31.00	....
Wire Rods, Pittsburgh	36.00	36.00	36.00	36.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	18.50	18.50	18.50	13.00
O. Steel Rails, Philadelphia	21.50	21.50	21.25	16.50
O. Iron Rails, Chicago	24.50	24.50	24.50	20.50
O. Iron Rails, Philadelphia	24.00	24.00	24.50	19.00
O. Car Wheels, Chicago	21.00	21.00	21.00	16.50
O. Car Wheels, Philadelphia	20.00	20.00	21.00	16.50
Heavy Steel Scrap, Chicago	18.00	18.00	19.00	12.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.92	1.92	1.95	1.60
Common Iron Bars, Chicago	1.80	1.80	1.90	1.60
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.50
Steel Bars, Tidewater	2.00	2.00	2.00	1.60
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.75	1.60
Beams, Tidewater	2.25	2.25	2.25	1.75
Beams, Pittsburgh	2.00	2.00	2.00	1.60
Angles, Tidewater	2.25	2.35	2.25	1.75
Angles, Pittsburgh	2.00	2.00	2.00	1.60
Skelp, Grooved Iron, Pittsburgh	2.12½	2.15	2.10	2.05
Skelp, Sheared, Pittsburgh	2.15	....	2.15	2.10
Sheets, No. 27, Pittsburgh	2.90	2.90	2.90	3.75
Barb Wire, f.o.b., Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b., Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.00
METALS:				
Copper, New York	11.50	11.50	11.75	16.50
Spelter, St. Louis	5.20	5.20	5.05	3.80
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	3.97½	4.25
Tin, New York	27.80	28.30	28.10	25.50
Antimony, Hallet, New York	8.00	8.00	8.00	8.50
Nickel, New York	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	4.19	4.19	4.19	...

* For 1903.

Chicago.

FISHER BUILDING, August 27, 1902.—(*By Telegraph.*)

Pig Iron.—As far as the volume of actual sales is concerned, the Pig Iron market during the week may be said to have been dull, but viewed from the standpoint of inquiry there has been as much activity as ever. Were the Iron available, either for the current year or for 1903 delivery, the volume of business would have been considerable. As it is there is much scurrying to obtain Iron for shipment during the next few months, and wherever it has been possible to obtain appreciable supplies higher prices have prevailed, No. 1 Southern Iron having sold as high as $25 at furnace, Birmingham, equivalent to $28.65, Chicago, while No. 2 has sold within $1 of No. 1. But the most urgent demand has been for Silvery Iron, with sales ranging from $30 to $32 for quick shipment. For delivery during the second quarter of 1903 some contracts have been closed on the basis of previous prices, but all told the volume of business would not aggregate over 15,000 tons, and probably less. The largest sale of the week was 3000 tons of No. 1 Southern Foundry at $19, Birmingham, for delivery in April, May and June, 1903. Three-fourths of this amount has been for Northern grades, but at the close it is difficult, almost impossible, to duplicate contracts of 10 days ago. The scarcity of Coke continues to be the most important feature, furnaces and foundries alike being in daily need and expecting almost any hour to be compelled to stop. Concerning foreign Iron little of interest comes to the surface, but that a number of foundries in the Central West are receiving aid through this source is certain. If ample supplies of Scotch and German brands can be obtained at reasonable prices the outlook may not be so serious for con-

sumers as the sold-up condition of both Northern and Southern domestic furnaces would indicate. The following are the nominal prices current for the first half of 1903:

Lake Superior Charcoal	$26.00 to $27.00
Local Coke Foundry, No. 1	22.50 to 23.00
Local Coke Foundry, No. 2	22.00 to 22.50
Local Coke Foundry, No. 3	21.50 to 22.00
Local Scotch, No. 1	23.00 to 23.50
Ohio Strong Softeners, No. 1	25.00 to 26.00
Southern Silvery, according to Silicon.	22.60 to 23.00
Southern Coke, No. 1	21.90 to 22.40
Southern Coke, No. 2	21.15 to 21.65
Southern Coke, No. 3	20.65 to 21.15
Southern Coke, No. 1 Soft	21.65 to 22.15
Southern Coke, No. 2 Soft	21.15 to 21.65
Foundry Forge	20.15 to 20.65
Southern Gray Forge	19.65 to 20.15
Southern Mottled	19.65 to 20.15
Southern Charcoal Softeners, according to Silicon	25.00 to 26.00
Alabama and Georgia Car Wheel	26.50 to 27.00
Malleable Bessemer	23.00 to 24.00
Standard Bessemer	25.00 to 26.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	27.00 to 28.00

Bars.—There is much difficulty in obtaining the exact condition of the market for Iron Bars in this section. The high prices prevailing for Scrap, notwithstanding the outlook for a more ample supply within a month or two, make rolling mills a unit in an endeavor to obtain more renumerative prices. Every mill, both East and West, is endeavoring to obtain 1.95c., Chicago, or 1.80c., base, Pittsburgh. Very little business seems to be secured at this price, however. Some mills in the Central West are offering to sell at 1.85c. at the mill without attracting much business, while others are offering to sell at 1.95c., delivered at Missouri River points, equivalent to 1.80c. at the mill. At the same time some sales are reported at 1.90c. and even 1.95c. for single car lots, Chicago. Under the circumstances it is not surprising that buyers are unsettled, but there is a more active inquiry all along the line, with some important business pending. There is also an increased demand for Soft Steel Bars, vehicle and agricultural manufacturers being again in the market. The following are the prices current: Bar Iron, 1.80c. to 1.85c.; Soft Steel Bars, 1.75c. to 1.90c.; Hoops, 2.10c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipment. The demand from store has continued active, with the following prices readily realized: Bar Iron sells at 2.25c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.50c.

Structural Material.—An increased demand has been experienced for all kinds of Shapes, especially for October and November delivery. Independent domestic mills which are in a position to make early shipments are selling readily in 1000 to 2000 ton lots, and further orders of importance are being placed for foreign material on the basis of 2c. to 2.15c. for Beams and Angles, Chicago. There has also been an improved inquiry for next year's delivery, and two orders—one of 2000 and one of 3000 tons—have been placed for delivery during the first half of next year. Domestic Steel mill shipment is firm, as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. The demand from store has been active, with the following prices readily obtained: Beams and Channels from local yards are quotable at 2.50c. to 3.50c., Angles at 2.50c. to 3.50c., Tees at 2.55c. to 3.50c., but premiums are often paid over these prices for special sizes wanted immediately.

Plates.—The demand has increased rather than otherwise, giving the mills little opportunity to make headway against orders booked, and full prices are readily obtained as follows: Tank Steel, ¼-inch and heavier, 1.75c. to 2.25c.: Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. Sales from store keep stocks well sold up, the following prices prevailing: Tank Steel, ¼-inch and heavier, 2.30c. to 2.50c.: Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.40c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—There has been quite an increased demand for Light Sheets; and Heavy Sheets, as heretofore, have sold well at full prices. Even Galvanized Sheets are selling a little more readily, but the market for the latter is heavy and weak. Quotations are as follows: No. 27 Black Sheets, 3.25c., mill shipment; from Chicago, small lots from store, 3.45c. to 3.55c. Mill shipment Galvanized Sheets sell at 4.05c. to 4.15c., net, and small lots from store are sold at 4.55c. to 4.65c. for No. 27.

Cast Pipe.—There are one or two municipal contracts pending, but none closed during the week. Sales of sizes running from 4's to 8's to private water and gas companies, however, have continued fair, and the market has remained firm at full prices, in sympathy with the strong market for Pig Iron. Manufacturers quote for the open market as follows: 4-inch, $35.75 to $36; 6-inch, $33.75 to $34; 8-inch and upward, $33. Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—There has been a fair order demand, but the market has been somewhat weaker in tone, independent mills being reported to have cut prices in some instances. Quotations, however, remain as follows, random lengths, Chicago: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—There has been a moderate degree of activity, and prices have continued firm as follows for mill shipment:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

The demand from store has been fair, and the market has been firm as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—Some of the independent mills making Tool Steel, Agricultural Steel and Open Hearth Spring Steel are reported to have succeeded in catching up with old contracts, and are now in the market for new business. The demand, too, is increasing, and the market has remained steady as follows for mill shipment: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—There is evidence that railroads have far from supplied their wants for next year, but only small contracts have been consummated during the week. One lot of 10,000 tons was placed by an Indiana road and 15,000 tons by the Big Four for Standard Sections, to be delivered during the first, second and third quarters of 1903. Official quotations continue firm at $28 for Standard and $27 for second quality at the mill. Light Sections are readily disposed of whenever offered at $32 to $45 per ton, according to weight and time of delivery. There is no decrease in the demand for Track Supplies, which remain firm as follows: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—Much lower prices are being paid in the Central West for foreign Billets, but the only sale of moment during the week is that of 1000 tons equivalent to about $29.60, Chicago, for delivery at a Michigan point. Some of the foreign Steel which was purchased two or three months since has been delivered in Chicago during the past ten days. There is a better demand for domestic Billets, but the market is weaker, in sympathy with the foreign product, and only small sales of domestic Open Hearth Forging Billets have been made, at $35 to $40, according to analysis, buyer and time of delivery.

Old Material.—While there have been freer offerings of heavy material, the general condition of the market has been unchanged, there being a good demand from the mills, and full prices have been obtained for nearly all kinds. It is pointed out that while about 100,000 tons of Scrap will be reclaimed from wrecked railroad cars only a small portion of this will come into the open market, as the Wheels and Journals, as well as Rods and Bolts, will doubtless be used by the car shops of the railroads to whom the cars belong. However, there will be some increase in the supply for the open market not before regarded as available. The offerings of Old Iron Rails have been much larger, the railroads demanding $26, but there are few buyers, if any, over $25. Three thousand tons of Relaying Rails have been sold at about $30.50 for fall delivery. The following are the prices current per gross ton:

Old Iron Rails	$24.50 to $25.00
Old Steel Rails, mixed lengths	18.50 to 19.00
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	30.50 to 31.50
Old Car Wheels	21.00 to 22.00
Heavy Melting Steel Scrap	18.00 to 18.50
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.50 to $22.75
Iron Car Axles	25.00 to 26.00
Steel Car Axles	23.00 to 23.50
No. 1 Railroad Wrought	21.00 to 21.50
No. 2 Railroad Wrought	18.50 to 19.00
Shafting	19.00 to 20.00
No. 1 Dealers' Forge	17.00 to 18.00
No. 1 Busheling and Wrought Pipe	15.00 to 15.50
Iron Axle Turnings	14.50 to 15.00
Soft Steel Axle Turnings	14.50 to 14.75
Machine Shop Turnings	14.00 to 14.25
Cast Borings	10.25 to 10.75
Mixed Borings, &c	10.25 to 10.75
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	16.50 to 17.00
Stove Plate and Light Cast Scrap	12.00 to 12.50
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	15.00 to 15.50

Metals.—No improvement has taken place in the market for Copper, and the demand has been only moderate for Ingot. Lake is held at 12c. in car lots and 12¼c. to 12½c. in a jobbing way. Pig Lead has remained firm, with light offerings and an active demand at 4.05c. for 50-ton lots and 4.07½c. in carload lots. Sheet Zinc has sold well, and remained firm at 6½c. in carload lots and 6.65c. in lots of 600

lbs. Old Metals have been in fair demand, with Zinc firm and Copper and Brass easy. Prices are as follows: Heavy Cut Copper, 10¾c.; Red Brass, 10¾c.; Copper Bottoms, 9¾c.; Lead Pipe, 3.80c.; Zinc, 3.65c.

Coke.—The little Foundry Coke that has reached Chicago during the past week, which has not been applied on contracts, has commanded $8 to $8.50 per ton, either for Connellsville 72-hour Coke or West Virginia Coke, on track.

Philadelphia.

FORREST BUILDING, August 26, 1902.

The stringency in Pig Iron shows no abatement. Consumers are pretty well to the end of their tether, and are largely dependent on the day to day receipts. The situation, trying as it is, has little in prospect to indicate better conditions, but the reverse. Besides the fuel scarcity there is now looming up the probability of a total inadequacy of transportation facilities. There is already what amounts to a complete blockade in many places. Miles upon miles of cars are on the sidings waiting for a chance to unload, but the trackage and terminal facilities are so restricted that it is impossible to get either in or out of many of the large mills without considerable delay. Fortunately or unfortunately, or both, the call for rolling stock to move the crops will be the heaviest on record, which still further complicates matters, but the worst of all is, that the strike in the Anthracite regions will divert Coal tonnage from the water routes to the railways. Even if the strike was settled immediately it would be too late to make heavy shipments by water, and as stocks are reduced to a minimum, the Coal tonnage by rail will necessarily be greater than ever before. Prospects for increasing the output at the furnaces are therefore extremely doubtful, and if the present rate of production can be maintained it will have to be by good management. Foreign material is being secured on favorable terms, and as there will be an immense demand for shipping to carry our agricultural products, it furnishes a basis for low rates of freight inward. It is not unlikely that Pig Iron will be brought in at a 4 to 6 shilling freight, which, under present conditions, is a piece of rare good fortune to consumers on the Atlantic seaboard. The European markets are stiffening a little, but there is no reason to expect any material advance, although they recognize that the American demand has saved them from a bad slump. Some extremely low quotations have been made during the past day or two, particularly for Steel, which can be laid down here duty paid at $4 to $5 less than for American Steel. Heavy purchases have been made of nearly all kinds of materials, and arrivals during the fall and winter months will no doubt be of great importance. The statement which has been widely circulated that 60,000 to 80,000 tons of Plates and Shapes have been purchased by a local shipyard is based on the idea that vessels will be built here to sail under the British flag. Some consideration has been given to this matter, but nothing definite has been done so far. The drawback in the duty, which could be had in a case of that kind, gives it an air of probability, and it may be that the day is not far off when the British flag will float over vessels "made in America."

Pig Iron.—There is no change in the Pig Iron situation, except that the metal seems to be scarcer and new business more difficult to arrange. Furnaces, as a rule, have sold so far ahead that they are afraid to increase their lines, although there are some who on long deliveries are disposed to take their chances, providing that the buyers are first class, but they pick their trade. There is a handsome margin at present prices, and although a big demand is expected, it is thought that by next spring conditions will be so changed that the output will be greatly increased. Meanwhile receipts from abroad are likely to be large, and in the long run will ease the market considerably. It is not alone the imports of Pig Iron that must be taken into consideration, but the tonnage of Scrap is very heavy, and Steel, finished or partly finished, is in the aggregate very important. For the present, however, there is nothing in sight likely to affect the market adversely. Desirable brands of Pig Iron are bound to be scarce for months to come, and although a good deal of foreign iron will come in, there will not be enough to affect prices, except as a check to inordinate advances. Prices abroad are a little stiffer than they were a week ago, but this is offset by lower freights, so that sales are made at about the same prices as for some time past. Cargo lots c.i.f. at about $19 for Middlesboro No. 3, small lots, $20 to $20.50; alongside or delivered in buyers' yards, $21 to $21.50. Scotch Iron ranges from $22.50 to $23.50, and American at about the same figures as quoted in our last, for city or nearby deliveries during the first half of next year (with a premium of $1 to $1.50 per ton on this year's deliveries):

No. 1 X Foundry	$23.50 to $24.50
No. 2 X Foundry	22.00 to 22.50
No. 2 Plain	21.00 to 22.00
Standard Gray Forge	20.50 to 21.00
Basic	20.50 to 21.00
Low Phosphorus	23.00 to 23.50
No. 3 Middlesboro (Prompt shipments or spot.)	21.00 to 21.50
Scotch Irons	22.50 to 23.50

Billets.—There is a considerable amount of dickering going on in foreign Steel, and large sales are liable to be closed at any moment. There are sellers at lower figures than $28, c.i.f. duty paid, bids being made at about $1 less, with a probability of sales at a medium figure.

Plates.—There is a good demand, with prospects that the utmost capacity of the mills will be required during the remainder of the year. The car shortage and inadequate terminal facilities hamper many of the mills, but in spite of that a large output is being made, all of which is taken as quickly as it can be shipped. Reports are around that heavy purchases for a Delaware shipyard have been made in Europe. It is not unlikely that inquiries and possibly options may have been secured, with the idea of building ships to sail under a foreign flag, but that is believed to be all there is in it at the present time. The rebate in duty in a case of that kind would be an important item, and it is not unlikely that business in that direction may materialize in the not very distant future. Quotations are firm and unchanged at last week's figures—viz.: Small lots, 2.10c. to 2.15c.; carload lots and upward, ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is no special change to note in this department, although it is still difficult to get prompt deliveries. As noted last week, however, the situation has been relieved somewhat by the better deliveries on back orders, which, in connection with foreign material, makes the market comparatively easy. Prices for Angles, Beams, &c., are about 1.72c. to 1.80c. for deliveries without guarantee as to date, but for prompt shipments 2.25c. to 2.35c. is about as well as can be done for carload lots and upward.

Bars.—There is a pretty good demand for Bars, and most of the mills are quite well supplied with work for the next month or six weeks. Prices are steady, first-class business is taken at 1.92c. to 1.95c., some mills quoting as high as 2c. for Refined Iron, carload lots as a minimum. Steel Bars, 1.80c. to 2c.; in some cases more than 2c. is paid for immediate shipments.

Sheets.—Business in thin Sheets is still somewhat quiet, but the mills are running full, and have good prospects for marketing their entire output before the close of the season. Prices easy on large orders and for Best Sheets as follows (Common one-tenth to two-tenths less): Nos. 10 and 12, 2.30c. to 2.40c.; No. 14, 2.50c.; Nos. 16 and 17, 2.70c.; Nos. 18-21, 3c.; Nos. 26, 27, 3.10c.; No. 28, 3.30c.

Old Material.—The demand is quite active, and desirable lots are readily taken at satisfactory prices. Bids and offers for deliveries in buyers' yards are about as follows:

Old Steel Rails	$21.50 to $22.00
Heavy Steel Scrap	20.50 to 21.00
Low Phosphorus Scrap	27.50 to 29.00
Old Steel Axles	26.00 to 27.00
Old Iron Rails	24.00 to 25.00
Old Iron Axles	29.00 to 30.00
Old Car Wheels	20.00 to 21.00
Choice Scrap, R. R. No. 1 Wrought	23.00 to 24.00
Country Scrap	19.00 to 20.00
Machinery Cast	19.00 to 20.00
No. 2 Light Scrap	17.00 to 18.00
No. 2 Light Scrap (Ordinary)	15.00 to 16.00
Wrought Turnings	16.00 to 17.00
Wrought Turnings, Choice Heavy	18.00 to 18.50
Cast Borings	10.00 to 10.50

Cincinnati.

FIFTH AND MAIN STS., August 27, 1902.—(*By Telegraph.*)

Except for narrowing lines and more limited opportunities the Pig Iron market, both North and South, is practically unchanged from what it has been for the last few weeks. Generally speaking prices are practically unchanged from last week. This is so almost absolutely in regard to deliveries for 1903, but of course nearby deliveries are still very irregular and each sale being regulated by the peculiar circumstances which environ it. From all quarters come stories of hardships which the furnaces are undergoing, and which tend in one way or the other to reduce the output. In this connection it is announced with what definite authority is not known exactly that the La Follette Furnace will start its fires on September 8. As yet no announcement has been made as to who will handle this Iron in this field. If it was really believed that this furnace, on or about that date, would actually commence making Iron for the market there would be no ordinary interest manifested in its movements. The general tendency of the 1903 market is to hardness, though, owing to the fact that most of the furnaces are practically sold up for the first six months and the offerings as a rule now small and scattering, the price has not advanced materially beyond the quotation of a week ago. Of spot Iron we hear of but very little of the higher grades selling or offering, and the basis of what sales there are just as given in the quotations. We are,

however, told of comparatively liberal offerings of No. 4 Foundry on the basis of $19.50, Birmingham, some No. 3 Foundry for September and October delivery, on the basis of $20, Birmingham, and Gray Forge, on the basis of $18. For next year's delivery we have a quotation of Ohio Silvery 8 per cent. Silicon for delivery after January 1 on the basis of $26 at furnace. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1	$24.25 to $26.25
Southern Coke, No. 2	23.75 to 25.75
Southern Coke, No. 3	22.75 to 24.50
Southern Coke, No. 4	22.25 to 22.50
Southern Coke, No. 1 Soft	24.25 to 26.25
Southern Coke, No. 2 Soft	23.75 to 25.75
Southern Coke, Gray Forge	20.25 to 20.75
Southern Coke, Mottled	20.25 to 20.75
Ohio Silvery, No. 1	26.10 to 26.60
Ohio Silvery, No. 2	25.85 to 26.10
Lake Superior Coke, No. 1	26.10 to 26.60
Lake Superior Coke, No. 2	25.60 to 26.10
Lake Superior Coke, No. 3	25.10 to 25.60
Car Wheels and Malleable Irons.	
Standard Southern Car Wheel, chilling grades	$26.75 to $27.75
Lake Superior Car Wheel and Malleable	26.00 to 26.25

Quotations for first six months of 1903, f.o.b. Cincinnati, the buyer to assume freight difference which may exist at time of shipment, are as follows:

Southern Coke, No. 1	$20.75 to $21.50
Southern Coke, No. 2	20.25 to 21.00
Southern Coke, No. 3	19.75 to 20.50
Southern Coke, No. 4	19.25 to 19.75
Southern Coke, Gray Forge	19.25 to 19.75
Southern Coke, Mottled	19.25 to 19.75
Southern Coke, No. 1 Soft	20.75 to 21.50
Southern Coke, No. 2 Soft	20.25 to 21.00
Lake Superior Coke, No. 1	24.10 to 24.60
Lake Superior Coke, No. 2	23.60 to 24.10

Old Material.—The market is a little weaker than it was eight days ago, though the loss in price is comparatively small. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $20.75 to $21 per net ton; Cast Scrap, $15.50 to $16 per gross ton; Iron Rails, $24 to $24.50, gross; Steel Rails, long, $24 to $24.50, gross; Steel Rails, short, $18.50 to $19, gross; Iron Axles, $27.75 to $28.25, net; Car Wheels, $20.75 to $21, gross.

Plates and Bars.—The market, while fairly active, is regarded as a little weak, though quotations are unchanged. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.92c., with half extras. Less than carload lots, 2.02c., with full extras.

Cleveland.

CLEVELAND, OHIO, August 25, 1902.

Iron Ore.—The first advances of the season in rates of carriage on Iron Ore have just been made. During the week the going rate from Escanaba to Ohio ports was advanced to 60c., and one charter was made between Duluth and Ohio ports at 80c. The Marquette rate has not been disturbed. It is evident, however, that a general advance in the rates of carriage on Ore is not very far away. The call for tonnage in other trades than that of Ore is beginning to be quite heavy, and by September 1 the diversion of many boats from the Ore trade will be seen. The Duluth grain shippers are already bidding better rates than the Ore shippers are paying, and the situation is strong. While conditions are changing rapidly at the head of the lakes very little change is seen in conditions at the unloading ports, where cars are scarce and delays to boats frequent and long drawn out in consequence.

Pig Iron.—The supply of Pig Iron has been further curtailed by the necessity to bank fires in the Mahoning and Shenango valleys on account of the scarcity of Coke. On Sunday more than half of the furnaces in the valleys went out of blast, and of the three furnaces in Cleveland but one has enough Coke to be sure of remaining in operation. The cause for the Coke shortage is not very easily explained. It has been apparent for a month or more that the consumption in this territory, both by furnaces and other concerns, was about up to the supply. In addition there has been a lessening supply of cars with which to move material, which is brought about by a lack of sufficient motive power. These causes have contributed their share toward the present condition, but the most serious is evidently the shipment of Coke away from these furnaces to keep those in the Eastern territory in blast. The necessity to make such long hauls with the Coke may also account for the shortage of cars and of engines, and the Coke and car situation in this territory may therefore, in part, be attributed to the strike of the hard Coal miners. The prices of all grades of Pig Iron are climbing steadily, and some of them have almost passed the point where buyers may use the material economically. It is evident now that the buyers for this year are proceeding with caution. The sales of Foundry Iron for spot delivery have all been on the basis of $25 at the furnace for No. 2, and only those who are in urgent need will buy at that price. Many of the foundries prefer to close rather than to pay the price. This disposition, however, has not stopped the sales for next year's delivery and the market is strong. No. 2 Foundry is selling for $22 at the furnace, and the material for first quarter delivery is very scarce with some apprehensions felt as to the supply for the first half. Among the basic producers very little is being done, but on such sales as are made the prices quoted are $20 for Standard Basic for second quarter delivery of 1903 and $20.50 for off Basic for immediate shipment. The latter grade will probably be more plentiful when the furnaces now out of blast have resumed operation. The Bessemer producers have not fixed a price as yet for the second quarter of next year, but the market is strengthening constantly and the prospects for a high price are good.

Finished Material.—The week has shown steady buying in all grades of Finished Steel, heavy specifications on orders previously given, and inquiries for material which could not be furnished in the prescribed time. The buying of Plates for next year's delivery has been very heavy, and reports have it that the larger mills are entirely sold up for the first quarter, and very well sold up for the second quarter. Plates for immediate shipment are out of the question, except in isolated cases, where some of the smaller mills have withheld their full capacity from the market, in the hope of getting such prices as are now being offered. The premiums at present are satisfactory to these smaller mills, as Tank and Boiler Plate are bringing about 2.10c. at the mill. No Universal Plates are to be had at any price. The larger mills in making sales for future delivery have held for the association price of 1.80c., Pittsburgh, while the smaller mills are demanding a continuance of the premiums into next year. The buying of Structural Steel has continued during the week, and other business has shown up on the market which would be placed were the mills in position to handle it. For instance, there was an inquiry for material for five ships. As the order anticipated winter work in the shipyards the mills could not promise to deliver the Steel. The Carnegie Steel Company this week accepted an order for 3000 tons of Structural Steel from the city of Cleveland for a crib that is to be built in the lake. Prices have continued as they were, the larger mills selling at 1.60c., Pittsburgh, and the smaller mills taking stock prices of from 2.75c. to 3.25c. In Steel Rails there has been some activity. A local railroad came into the market and bought 2000 tons of Rails at the association price of $28 for next year's delivery, and there have been other inquiries which indicate an enormous amount of business ahead if the mills are only in position to handle it. The demand for Light Rails is large, but the supply is limited. The demand for Sheets is not very large, especially for Galvanized, while Black Sheets are somewhat harder to obtain. In Black Sheets a slight tendency to undersell the regular prices is bringing the quotations down somewhat. The basing price is 2.35c. to 2.50c. for No. 10. On Galvanized Sheets prices are down considerably, and the material is plentiful. Quotations are 3.10c. for No. 27 and 2.10c. for No. 10, as the respective bases for the lighter and heavier gauges. Bars are in about the same demand that they have been for some time. Large rounds are difficult to obtain, while the smaller sizes are plentiful. There has been no break in prices, the association's quotations of 1.60c. for Bessemer and 1.70c., Pittsburgh, for Open Hearth, prevailing. In Iron Bars there is a different situation altogether, and while the same quotation prevails as formerly, it is evident that the sales of this material are light. The price ranges between 1.70c. and 1.80c., Pittsburgh, the main being about the prevailing quotation. Billets are in demand at $32.50 for the domestic product, and the supply cannot be said to have increased in any respect.

Old Material.—There has been a moderate demand for Scrap during the past week, but it is evident that the market has not been as robust as formerly, and the consumers have shown no desire whatever to buy ahead of their actual requirements. Prices continue as follows: No. 1 Wrought, $19.50, net; Iron Rails, $27.50, gross; Iron Axles, $28, net; Cast Borings, $10, gross; Wrought Turnings, $15.25, gross; Cast Scrap, $16, net; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

St. Louis.

CHEMICAL BUILDING, August 27, 1902.—(*By Telegraph.*)

Pig Iron.—The market shows a continuance of the very quiet tendencies, which are the more striking, succeeding as they do the active days early in the month. The mixed condition of ideas of the buyers on the future of the market is apparent in the record of some recent sales at prices ranging from $18 to $22.25, Birmingham basis, for No. 2 Foundry, delivery January and February. The old complaint of lack of cars for transportation of furnace products exists and is a constant annoyance and hindrance to the trade. The following is the range of prices current for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$21.50 to $24.00
Southern, No. 2 Foundry	20.75 to 23.25
Southern, No. 3 Foundry	20.25 to 22.75
Southern, No. 4 Foundry	19.75 to 22.25
No. 1 Soft	21.25 to 23.75
No. 2 Soft	20.75 to 23.25
Gray Forge	19.75 to 21.75

Southern Car Wheel Iron	19.75	to	22.25
Malleable Bessemer	....	to	....
Ohio Silvery, 8 per cent. Silicon	....	to	....
Ohio Strong Softeners, No. 1	....	to	....
Ohio Strong Softeners, No. 2	....	to	....

Bars.—The jobbing trade refer to the demand for Iron and Steel Bars as showing broadening tendencies. Prices still rule on the same basis. We quote from the mills: Iron Bars at 1.90c. to 1.95c. and Steel Bars at 1.90c. to 2c. Jobbers quote Iron Bars at 2.25c. and Steel Bars at 2.25c.

Rails and Track Supplies.—This department of the market is still dominated by the same conditions of large and urgent demand, and any new requirements stand a rather slim chance of prompt shipment. We quote as follows: Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; with Hexagon Nuts, 3.25c. to 3.30c.; Spikes, 2.50c. to 2.60c.

Angles and Channels.—Among the jobbing trade a freer movement of Small Angles and Channels is to be noted, and the increase in transactions is being maintained from week to week. For material of this class 2.50c., base, is the quotation.

Pig Lead.—The market for Pig Lead continues quiet, and except that prices are well maintained it lacks features of importance. Chemical is quoted at 3.97½c. to 4c. and Desilverized at 4.05c.

Spelter.—The movement in the Spelter market is considerably smaller, and transactions for September delivery are on a basis of 5.20c. bid and 5.25c. asked.

Pittsburgh

(By Telegraph.)

PARK BUILDING, August 27, 1902.

Pig Iron.—The Pig Iron market is very strong, largely owing to the fact that the output is very restricted, owing to the scarcity of Coke. At the present time five or six of the Valley furnaces are down, and there is some talk of a general shut down next week unless the Coke situation improves. Bessemer Iron for shipment in the last quarter of this year is very firm at $21.75 at furnace, and several sales have been made at this price. For shipment in the first quarter of next year $2, at furnace has been done. There is a stoppage in buying of Forge Iron, and it is quiet, with prices slightly weaker. We quote Northern brands of Forge at $21.75, Pittsburgh, but on a firm offer a little lower might be done. Foundry Iron is exceedingly scarce, and can hardly be bought at any price. It has sold for delivery in the first quarter at prices ranging all the way from $21.50 to $22.75, Pittsburgh.

Steel.—There is not much doing, and there is more or less Steel pressing the market. Consumers are holding off and are buying only from hand to mouth, believing prices will be lower. Domestic Steel is nominally $31, Pittsburgh, but on a firm offer this might be shaded. Foreign Billets can be laid down at $29.75 to $30, Pittsburgh.

(By Mail.)

The principal factors of interest in the Iron trade at the present time are Pig Iron and Coke. Probably the worst shortage of Coke that has been known in the Iron trade for years now exists, and at this writing five or six furnaces in the valleys are shut down for want of Coke, with a probability that more stacks will have to bank before this week is out. The Coke operators disclaim any responsibility for the shortage, laying the blame entirely on the railroads, and the charge seems to be well founded. There is no doubt whatever but that the rapid growth of the Pittsburgh district, including the Mahoning and Shenango valleys as well, has simply left the railroads in the rear, and they are utterly unable to take care of the tonnage that is offered. As long as the present prosperous condition in the Iron trade lasts, and the blast furnaces are ready to take every pound of Coke that can be made, it is not likely there will be much relief, but, on the contrary, shortages of cars will take place right along. With the entrance of the Wabash Railroad into Pittsburgh some relief will be afforded, but it will be more than a year before the Wabash will be a factor in the situation. A leading Coke interest has been compelled to bank down a number of ovens in the Connellsville region for want of cars to ship out the Coke, and thousands of tons are piled up in the region awaiting cars for shipment. The claim that Coke is being sent East at fancy prices instead of being applied on Western contracts is not well founded. On the contrary, the Coke operators are making every effort to give the furnaces the Coke they so badly need, but cannot get cars in which to ship it. This situation has resulted in Pig Iron becoming scarcer than ever, and it is almost impossible to buy Iron at any price. Bessemer Pig for delivery in first quarter of 1903 has sold at $21, at Valley furnace. This price, however, could hardly be obtained for second quarter delivery. Gray Forge is somewhat dull, and the supply is in excess of demand. A good deal of Foundry Iron is changing hands, and sales of Northern No. 2 have been made as high as $22.75, Pittsburgh, for first quarter. Southern No. 2 is being offered as low as $17, Birmingham, equal to $21.15, Pittsburgh. Foreign Foundry is being offered at about $21, but owing to its running so high in phosphorus the trade here does not like it. In Finished Iron and Steel the situation is without change. Plates and Structural Material are active, and there is a good demand for Bars. The rest of the Finished lines, such as Sheets, Tin Plate and Skelp are quiet. The Sheet and Tin Plate trades especially are very dull, and prices on the former are showing an easier tendency.

Muck Bar.—We note a small sale of Muck Bar for spot shipment at $37, delivered buyer's mill, Pittsburgh. We quote at $36 to $37, depending on tonnage and deliveries wanted, and note that demand is quiet.

Steel Rails.—The Norfolk & Western road has placed a contract for 24,000 tons of Rails, and the Canadian Pacific is in the market for 50,000 tons. The Rail mills are well sold up for first six months of 1903. We quote at $28, at mill, for Standard Sections.

Hoops and Bands.—Demand is said to be a little better, and the three leading interests are said to be pretty comfortably filled. We quote Hoops at 1.90c. for 250-ton lots and over and 2c. in carloads. Bands are 1.60c. for Bessemer stock, 12-gauge and heavier, while for Open Hearth stock $2 per ton advance is charged.

Rods.—The market on Rods is quiet, but prices are fairly firm, owing to high prices of Steel. Bessemer Rods are quoted at $36, at mill.

Ferromanganese.—There is very little doing, as the leading consumers in Pittsburgh are well covered, some through the first six months of next year. We quote foreign Ferro at $52.50, delivered here, but large contracts made some time since were at a much lower price.

Spelter.—We quote Prime Grades of Western Spelter at 5.37½c. to 5.40c., Pittsburgh.

Structural Material.—No large contracts have recently been placed, and it is said foreign importations have been very much overestimated. The leading mills are sold up for months ahead and a heavy tonnage has been booked for next year. A good many small mills are rolling Angles, and these are more easily obtained than Beams and other Shapes. Prompt Beams and Channels bring almost any price asked, and are almost impossible to obtain. As high as 3c. has been offered for prompt Beams, without getting them. Official prices for deliveries late this year and next year are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inch, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Bars.—Tonnage being placed in both Iron and Steel Bars is mostly for small lots, but as the mills are well filled up on old contracts they are not actively seeking new business, and prices are very firm. This is especially true of Iron Bars, fixed prices on which are firmly held. In fact, some mills are quoting Iron Bars for prompt delivery as high as 1.90c. to 2c. We quote Steel Bars at 1.60c at mill. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c. in carloads and 1.90c. in small lots, f.o.b. Pittsburgh, half extras as per National card.

Plates.—Tonnage in Plates continues heavy, and for delivery during the balance of this year mills that have any Plates to spare quote from 1.75c. to 1.85c. at mill. The leading Plate interest continues to quote on the basis of 1.60c., but only for delivery during next year. Official prices, which really pertain only to Plates for shipment next year, are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Skelp.—The Skelp trade is quiet, and Eastern mills are offering Grooved Iron Skelp as low as 2.10c., Pittsburgh, and might accept less on a firm offer. Local Grooved Iron Skelp is held at 2.12½c. to 2.15c., delivered. Steel Skelp is higher than Iron, and Sheared is held at about 2.25c., and Grooved at 2.15c. Several sales of Eastern Grooved Iron have been made at 2.05c., Pittsburgh.

Sheets.—The Sheet market continues in very unsatisfactory condition, so far as new tonnage is concerned, and prices are showing signs of softening, especially by the outside mills. We quote No. 27 Black Sheets at 2.90c., and No. 28 at 3c. It is probable that for a good order some mills might accept about 5c. a hundred pounds less than the above. Galvanized Sheets are also very dull and we quote at 75 and 2½ off for carloads and larger lots. Job-

bers charge from $2 to $3 a ton advance over these prices to the smaller trade.

Merchant Steel.—There is some inquiry from Implement makers for material for shipment in last quarter and first three months of 1903, and it is expected some business from this class of consumers will soon be placed. There is more or less cutting in prices of Tool Steel. We quote: Tire, 2.15c. to 2.25c.; Sleigh Shoe, 2.15c. to 2.25c.; Spring Steel, 2.20c. to 2.30c., and Toe Calk, 2.25c. to 2.35c. Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. off in less than carloads, delivered in base territory. Tool Steel is 6½c. to 8c. for ordinary grades and 12c. and upward for special grades. These prices are f.o.b. at mill.

Merchant Pipe.—Demand for this season of the year is fairly active, all the leading Pipe mills have a good deal of tonnage, and as a result prices are firmly held. Discounts to jobbers in carload lots are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ⅛ inch, inclusive	60	48
¼ to 12 inch, inclusive	67	55

Old Material.—Prices on Scrap continue relatively high and consumers are holding off waiting for lower figures. We quote as follows: Low Phosphorus Melting Stock, $24.50 to $25; Ordinary Melting Stock, $21 to $21.50; No. 1 Cast Scrap, $19 to $19.50; Borings and Turnings, $10.50 to $11, all gross tons. No. 1 Wrought Machinery Scrap is quoted at $21 to $22 per net ton. No. 1 Wrought Scrap is $19.50 to $20 in net tons.

Coke.—The situation in the Coke trade is fully set forth in the opening of this report. Furnaces that have contracts placed for Coke cannot get it as fast as needed, while stacks in Eastern Pennsylvania and elsewhere, that have been affected by the Anthracite Coal strike are offering as high as $4 a ton for prompt Furnace Coke. Output in the Connellsville region is running about 250,000 tons a week. We quote Furnace Coke for prompt delivery at $3.50 to $4 a ton.

About September 1 the offices of W. P. Snyder & Co., Iron and Steel factors, will be removed from German National Bank Building to suite Nos. 622, 623 and 624 Frick Building, Pittsburgh. On the same date the office of the Shenango Furnace Company, an identified interest, will also be removed from German National Bank Building to Rooms 625-626 Frick Building. About September 1 the offices of the Clairton Steel Company, of which W. P. Snyder is president, will be removed from German National Bank Building to Rooms 618-621 and 631 Frick Building, Pittsburgh.

French Iron Market.

PARIS, August 8, 1902.

Quiet is the dominating feature of the French metallurgical market. If few of the works are still running full it is only due to the fact that they have made sales for long delivery some time since. In spite of this prices are held firmly, and concessions which are obtained are of little consequence. Pig Iron, however, is an exception. The agents of the blast furnaces are asking 5 francs per ton more than they did some months ago. The foundries and rolling mills are slow to accept these prices, and if they do make purchases make them only to cover short time contracts.

During the first half year imports were only 14,000 tons, as compared with 33,000 tons during the first six months of 1901, and 85,000 tons in the corresponding period of 1900. On the other hand, exports have increased considerably. They were 96,000 tons during the first six months of 1902, as compared with 40,700 tons during the corresponding period of 1901. These exports, however, are made at prices very much lower than those which are secured in the home markets, the greater part of the Iron going to Belgium.

There are in France 158 blast furnaces, of which 97 are in blast and 51 are out. In the eastern district out of 55 furnaces in blast 12 make an average of 988 tons of Mill Iron per day; 19 produce an average of 1181 tons of Foundry Iron, and 24 an average of 2660 tons of Thomas Pig. The total production, therefore, is 4799 tons per day.

In the northern district no Foundry Iron is made. Out of 20 furnaces ten are running, which produce 1045 tons per 24 hours. Six of the furnaces are running on Forge at the rate of 585 tons per day, and four on Thomas Pig, making 460 tons.

In the central district in the south and in the east there are 32 blast furnaces in operation out of a total of 56. The works, owing to their geographical position are less favorably situated as to the assemblying of raw materials, and therefore they hesitate to start additional stacks. Besides the consumption of the interior is light, and the inevitable effect of blowing in would be a lowering of prices. The result is that certain works produce in the same furnace alternately Mill Iron and Foundry Iron, according to requirements. The average production of the region is 1362 tons of Mill Iron, 445 tons of Foundry Iron and 160 tons of Thomas Pig, No. 1. All these figures apply to August 1.

The situation in the Foundry trade is unfavorable, as the result of lack of orders with the shops. A general decline in prices has taken place. The manufacturers of cars and of rolling stock, of bridges and buildings, have some work, but it cannot be stated that it is abundant. The Bolt works are even less well supplied. Some of the metallurgical works in the Ardennes will soon be forced to dismiss a part of their force unless new work comes in to take the place of orders which are being filled. One of the industries which is in very critical condition is the manufacture of Arms. The National Works at St. Etienne has dismissed 1300 men for whom there was no work. This has produced an unfavorable impression, particularly since the metallurgical and mechanical industries are so poorly employed that they cannot take care of the men so dismissed. The manufacturers of Nails had a meeting at Paris on July 17, and the result of their interchange of opinion was that the demand is active enough to justify a maintenance of prices.

In the Meurthe & Moselle department the large Steel works have fairly well filled order books and maintain prices of beams at 16½ francs for No. 1; Beams at 18 francs, and No. 2 Iron Plates at 22 francs.

In the Loire and Centre districts nothing of interest is transpiring. This is the dead season, and nothing seems to indicate an early revival. Iron Bars are selling at 18 francs.

In the department of Haute Marne the mills are well supplied with work, and easily maintain their prices at 17 francs for No. 2 Beams. Drawn Wire is 21 francs and Galvanized Wire 25 francs.

In the northern district business has become very quiet, and prices on Bars have receded from 16 to 15.75 francs. It is probable that the mills would even accept lower prices.

Birmingham.

BIRMINGHAM, ALA., August 25, 1902.

The strength of the Iron market depends upon from what point of view one regards the market. Judge it by the prices paid and one can regard it only as a strong market. Measure it by the quantity that changed hands and one would say it lacked the essential element of strength that is indicated by a large demand. But one must consider that transactions are limited by the scarcity of offerings. Iron still comes on the market in small quantities only, and it continues to be snapped up as fast as it is offered, leaving a raft of orders unsatisfied. These orders are not carried for further consideration, but are dropped with the day of receipt. The business of each day ends with the day of receipt, and but little of it is carried over to a more convenient season. There is still the same difficulty in filling orders for prompt delivery that has been reported heretofore in these letters; and there is nothing, so far, to indicate any improvement in this receipt in the near future. During the week the orders for prompt delivery were greater than has been the case in the immediate past. This was attributed to the temporary shut down of furnaces at Western points; but conditions here were such that no relief could be afforded to the situation, and a considerable amount of business had to be declined at prices that sellers would have been willing to accept.

The question of price is hard to determine, for there is still no regular difference observed between grades. It not infrequently happens that two or more grades sell at the same price. One of the best feeders of Iron to the spot market told your correspondent that he was making a difference of only 50c. between grades; and, in some cases, there was practically no difference. Some No. 2 Furnace sold at $23 and some Gray Forge at $18. As has been the case of late the sales were insignificant in volume. The large difference in price between No. 2 Foundry and Gray Forge shows plainly where the famine in Iron is greatest. The Foundry grades are most in request and the hardest to obtain. Sales of some grades are not reported, and they are hard to quote with any accuracy. Irregularity in values yet rules the market.

There is no improvement yet in the prospects for increased production in the near future. As it is, we are far below maximum capacity. The scarcity of Coke continues to be acute and there is little or no encouragement to anticipate any change for the better in the near future. It is very firm in price and buyers are earnestly seeking it in other districts. Results are often disappointing as it is not a question of preference, but a question of getting any at all. The price keeps pretty regular at $4.50 to $5. Attention has been directed to an increase in the Coke supply in this district, as new batteries of ovens are being erected and others are being planned that will follow as fast as opportunity permits. The Anniston Furnace Company, who lately purchased the Milner Coal interests at Jasper, will increase the number of ovens from 175 to 500 and increase their Coal output from 5000 tons to 15,000 tons daily, and will expend at least $175,000 in improvements and betterments. The Southern Car & Foundry Company anticipate that by September 15 their Charcoal furnace at Gadsden will be ready to go into commission. Upon its completion the erection of the second stack will be commenced. The two will give them a supply of 100 to 125 tons of Charcoal Iron per day. They anticipate that their own needs will

absorb their output. Progress at their large plant at Wylam is slow. Delays of all kinds that were unavoidable have hampered all building operations. The crop of disappointments has been heavy.

We are on the eve of the movement of the cotton crop and the same old story of car shortage is becoming current again, and shippers are complaining of difficulties in obtaining cars. Two years or more ago it was pointed out in these letters that business was increasing faster than facilities for moving it. Though the movable equipment has been largely increased, there is still a large deficiency in the transportation departments of the various roads centering here, and the prompt dispatch of business suffers accordingly. At the rate of our present growth there is no escape from still further large additions to the rolling stock of all our roads. But the roads as a rule don't seem to appreciate the necessity for an increase in these facilities until it is literally forced upon them. Shippers of Coal, particularly, are loud in their complaints of the inconvenience they are put to by the failure of the roads to furnish prompt facilities for moving their Coal, and it is seriously hampering their business. If on the eve of the cotton movement this evil is saddled upon us, what will it be when the cotton movement becomes active. While the increase in business has been great, it has not been a surprise to level headed men who were posted on conditions prevailing in the district.

Attention has frequently been directed to the scarcity of labor in this district, which has been and is now a bar to a more rapid development of our resources. It has caused the donning of thinking caps and the consideration of plans to mitigate that evil. As a result, some of our Coal operators have determined to use compressed air in getting out their Coal. In the majority of our mines the plan, it is claimed, is perfectly feasible and the cost will be less and mining efficiency much greater.

New York.

NEW YORK, August 27, 1902.

Pig Iron.—Locally the market has been quiet, so far as new orders for domestic Pig Iron are concerned. The troubles as to fuel supply in the Lehigh Valley are becoming more acute and the production is falling off further. We do not hear of any additional sales of magnitude of foreign Foundry Iron and asking prices are a trifle higher. For delivery in 1903 the following quotations are made: Northern Iron, at tidewater, No. I X, $23.25 to $24.75; No. 2 X, $22 to $22.75; No. 2 Plain, $21 to $21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, $22.25 to $23; No. 2 Foundry, $21.25 to $22; No. 3 Foundry, $21 to $21.25. Foreign Ferromanganese is offered at $51 to $51.50, delivered.

Steel Rails.—The Southern Pacific has placed an order for 50,000 tons with American mills, and one of the Harriman roads is now in the market for about 12,500 tons. The associated mills have now taken orders for 1903 aggregating 1,150,000 tons, to which 300,000 to 350,000 tons to be carried over this year must be added. We continue to quote Standard Steel Rails, $28 at Eastern mill.

Finished Iron and Steel.—The market continues quite active in the heavy lines. Among the recent large contracts taken by the American Bridge Company is a lot of 6000 tons of heavy work for track elevation at Chester, Pa., for the Pennsylvania Railroad. It will take about a like quantity to finish the work and additional tonnage for Wilmington, Del. We quote, at tidewater, as follows, but for small lots and prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2c. to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.10c.

Metal Market.

NEW YORK, August 27, 1902.

Pig Tin.—Weakness has marked the Tin market throughout the week under review. At the close of last week there was some speculative buying here, covering a few hundred tons of spot and nearby Tin, but the market since has been very quiet, with downward tendency. Offerings from the East were quite free at lower figures, which fact materially affected the quotations on later deliveries. Arrivals so far this month have amounted to 3240 tons, with 2674 tons afloat. The tone of the market was weak, both here and in London. At the close spot Tin was ½c. lower than at the date of our last report, but futures held steady. Following are the closing quotations: Spot and August, 27.80c. to 27.95c.; September, 27.55c. to 27.40c.; October, 27c. to 27.40c.; November, 26.75c. to 27.10c.; December, 26.50c. to 26.90c. The London market closed at £125 17s. 6d for spot and £122 5s. for futures, a decline of £2 2s. 6d. for spot and of £2 for futures, as compared with last week.

Copper.—Little or no change has occurred in the Copper market. The consumptive demand has been very light. Prices are without quotable change and in buyers' favor. Exports so far this month show a total of 8200 tons. The market was lower and weak at the close, Standard being quoted at 10.75c. to 11.15c. for spot to November, and Lake at 11.50c. to 11.65c. for spot and August, and 11.45c. to 11.60c. for September-December. Electrolytic and Casting rule at 11.30c. to 11.40c. for spot to December. The London market closed at £51 10s. to £51 16s. 3d. Best Selected declined 5 shillings to £55 15s.

Pig Lead.—The market continues quiet and firm, with no change in prices or in general conditions. The London market is unchanged at £11 2s. 6d. The American Smelting & Refining Company continue to quote 4.12½c. for spot, and 4.10c. for futures.

Spelter.—Scarcity of spot metal continues the dominant feature of the Spelter market, which has remained quiet, but firm. Spot is quoted at 5.50c. here and September at 5.40c. St. Louis quotes 5.25c. for spot and 5.20c. for September-October shipments. The London market advanced 5 shillings to £19 2s. 6d.

Antimony—Is unchanged. Hallett's is quoted 8c.; Cookson's, 10c., and other brands, 7¾c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Tin Plates.—The market is dull and uninteresting, with an absence of any important buying. Prices are without change. The American Tin Plate Company are quoting for delivery up to December 1 on the basis of $4.19 per box for Standard 100-lb. Cokes, f.o.b. New York, or $4, f.o.b. Pittsburgh. The Welsh Tin Plate market has declined 3 pence, quotations being now 12 shillings 6 pence, Swansea.

Iron and Industrial Stocks.

Colorado Fuel & Iron stock has furnished the principal sensation during the week, fluctuating wildly day by day. On Friday last and again on Monday it dropped as low as 73¾, but rose as high as 79½ on Tuesday. Republic Iron & Steel stock has gained quite steadily, reaching 21½ during the week for the common and 78¾ for the preferred. Cambria Steel has hovered about 27¾ and 28, while Pennsylvania Steel common rose to 46⅜, a new record on Tuesday. United States Steel issues have been quite steady. Virginia common sold as high as 21 on Monday.

Alabama Consolidated Coal & Iron Company.—At the regular meeting of the directors of the Alabama Consolidated Coal & Iron Company, held at Baltimore on August 21, the quarterly dividend of 1¾ per cent. on the preferred stock was declared, payable on September 1. The report of the treasurer for the three months ended July 31 showed net earnings, after charging off prospective repairs, royalty, depreciation and interest, of $110,732.87. The quarterly dividend requires $43,106, leaving a surplus for the three months of $67,626.87, or at the rate of 10½ per cent. on the common stock. Owing to the strike of all the coal miners in Alabama in July, mining operations were completely shut down for about three weeks, and during a part of the time all furnaces had to be banked because of the lack of coke. This reduced the output of coal and iron by more than one-half for that month, or otherwise the net earnings for the quarter would have been even larger than they were. President Bush reported that work on the new furnace at Gadsden, which is expected to make from 250 to 300 tons of iron a day, is being vigorously pushed, with a view to completing it, if possible, by January 1. Contracts have been let for 50 additional coke ovens, and 50 now under construction will be completed about September 1. All of these enlargements, including the new furnace, are being made out of the surplus earnings, the policy of the management being to develop the coal and iron output to probably double the present production as rapidly as possible. The new coal mine Hewitt, named after Abram S. Hewitt, one of the directors, made its first output of coal last week, the average weekly production now being nearly 11,000 tons. The iron which is now being delivered was sold some months ago at an average of about $13 a ton, whereas all sales now being made for delivery next year are on the basis of $17 a ton for No. 2 Foundry.

The Westinghouse Foundry Company, chartered in Pennsylvania last December to build a foundry for the Westinghouse Machine Company on the Pennsylvania Railroad some 25 miles south of Pittsburgh, have made an issue of $1,000,000 of 5 per cent. bonds, dated May 1, 1902; interest periods, May 1 and November 1; principal redeemable in series of $50,000 each at 105 after five years from May 1, 1902. These bonds are guaranteed by the Westinghouse Machine Company.

Dividends.—The Republic Iron & Steel Company of

Chicago have declared the regular quarterly dividend of 1¾ per cent. on their preferred stock, payable October 1. Books close September 19 and reopen October 16.

United States Wire & Nail Company.—PITTSBURGH, PA., August 27, 1902.—A special meeting of the stockholders of the United States Wire & Nail Company was held in the Lewis Block, Pittsburgh, on Saturday, August 23, at which it was decided to increase the capital stock of the concern from $200,000 to $300,000. The increased capital will be used in making improvements and in adding new departments to consist of a galvanizing plant, which will have a daily capacity of 30 tons, bale tie plant with a daily capacity of 50 tons and woven wire fence plant with a daily capacity of 25 tons. These new departments will be so built that their capacity can be increased at any time. The improvements to be made will consist principally of new and larger boilers and a continuous heating furnace in the rod mill. The present plant of the United States Wire & Nail Company consists of a wire rod mill with a daily capacity of 200 tones, a wire mill with a daily capacity of 50 tons and a wire nail mill with a daily capacity of 50 tons. The output of these departments will be materially increased in order to provide material for the new departments which are to be added. Work on these improvements and additions will be pushed as fast as possible.

The Sterlingworth Car Company.—The new plant of the Sterlingworth Car Company, which is to be located next to the Frankford Forge Works in Eddystone, Pa., will be one of the largest employers of labor in the Chester industrial community, if the present plans of the projectors are carried out. As announced previously in *The Iron Age* some few weeks ago, the main buildings will be immense structures covering an area about 300 x 600 feet, and will be equipped with all appliances for entering into competition with the other large establishments manufacturing steel cars. It is planned to build about 30 cars a week, an output which will necessitate the employment of about 1000 hands in the various departments of the business. The cars to be built by this new company will be of steel construction throughout. They will be built up of angles, channels, beams and plates, a plan which enables damaged parts to be easily removed.

The annual report of the Labor Department of the British Board of Trade records a decline in the average rate of wages in the United Kingdom for the first time since 1895. The decrease was mostly in miners' wages, no less than 625,000 miners being affected during the first half of 1902. The report says it is satisfactory to note the increased tendency to settle changes of wages by conciliation or arbitration. Only 2 per cent. of the workers whose wages were reduced in 1901 engaged in disputes on this account.

The threatened strike of molders in Cleveland, Ohio, has been averted. Representatives of the National Foundrymen's Association and the Iron Molders' International Union held a conference and reached an understanding which was ratified at a mass meeting of the molders. Under the scale which expired Aug. 1 bench molders received a minimum wage of $2.65 a day and floor or machinery molders $2.85. The demands of the men were for a flat advance to $3.10 all around. Under the new agreement the bench men will be paid $2.85 and the floor men $3 a day. The agreement is for one year from Aug. 1. Ten hours will constitute a day's work.

E. Norton of Catasauqua, Pa., has been appointed furnace superintendent for the Troy plant on Breaker Island, N. Y., which is now being put into shape for work.

The question is being considered of blowing in the Crown Point furnace of the American Steel & Wire Company at Crown Point, N. Y.

The Antwerp Ivory Market.

George F. Lincoln, Consul-General at Antwerp, reports: The third quarterly ivory sale closed July 30, 1902, the ivory offered and sold being:

Congo:	Pounds.
Hard	100,729.2
Soft	7,405.2
Angola	34,786.4
Kamerun	8,850
Ambriz	2,873.2
Gaboon	422.4
Gold Coast and Senegal	1,104.4
Benguela and Abyssinia	314.6
Hippopotamus tusks	88.6
Total	156,574

Previous sales for coresponding periods have shown:

	Pounds.
1901	158,855.4
1900	170,937.8
1899	160,397.6
1898	78,229.8

The sale was animated, and the advance in price for tusks of all weight was from 20 to 40 cents. The market for bangles was very firm and the fine lots were sold at from 10 to 20 cents above former prices. Tusks for billiard balls were firm and sold at an increase of 20 cents, save soft tusks, for which the increase was 60 cents. The market for scrivailles was rather irregular, generally falling from 10 to 20 cents.

The stock on hand amounts to 298,597 pounds, against—

	Pounds.
1901	279,400
1900	209,000
1899	224,400
1898	174,264

The next quarterly auction sale will take place November 4, 1902.

The National Steel & Wire Company have been incorporated under the laws of Maine with a broad charter giving them a wide range of operations. The capital stock of the company is $5,000,000, consisting of $2,500,000 7 per cent. cumulative preferred and $2,500,000 common. They have acquired control of the National Wire Corporation of New Haven, Conn., the De Kalb Fence Company of De Kalb, Ill., and the Union Fence Company, also of De Kalb, Ill. The plant at New Haven is new from start to finish. The rod mill is now in operation and the other departments are in course of construction. The power at this plant is ample for all purposes, aggregating 6000 horse-power.

The Pittsburgh Tool Steel Wire Company of Pittsburgh now have their plant which they have erected at Monaca, Pa., in operation and are now in a position to take care of orders for drill rods, needle wire, &c. F. C. Eaton is manager and G. Stengel, Jr., secretary and treasurer.

The Continental Bolt & Iron Works of Chicago, manufacturers of bolts, turnbuckles, building rods and nuts and washers, have moved from Michigan and Franklin streets to a much larger factory at Union and Twenty-second streets, Chicago.

Metallic construction appears to have had not the least power of resistance during the volcanic eruption at St. Pierre. Not only was it incapable of withstanding the weight of the burning matter, but some chemical action is likely to have taken place which transformed the particles. M. Amedée Knight, a senator of Martinique, was on the island at the time of the disaster, and describes the effects as corresponding with those which might be expected if some colossal Nasmyth's hammer had been employed in operation on the town. Most things have been reduced to a fine powder. One of the cases mentioned is the market of St. Pierre. After the cyclone of 1891 the authorities decided to reconstruct it in the most solid manner. Cast iron was adopted. It is said to have been impossible to find the slightest trace of construction which had an area of 2000 meters square.

The New York Machinery Market.

NEW YORK, August 27, 1902.

The E. W. Bliss Company and the United States Projectile Company, both of Brooklyn, have been consolidated, and will in the future be controlled by the same officers. Heretofore the two companies, while distinct and independent, have been owned by practically the same men. The Bliss Company are the largest manufacturers in the world of presses, dies and special machinery for working metal. They also make the Whitehead submarine torpedo for the United States Government. The Projectile Company manufacture the well known "Projectile" brand of pressed steel gears and pinions, together with their regular line of projectiles. During the past year they have been compelled to double the capacity of their works and are even now contemplating important additions in order to enable them to keep up with the increasing demand for their products. Hereafter this plant will be known as the E. W. Bliss Company, Projectile Department. The Bliss Company are capitalized at $2,000,000, $1,000,000 of which is common and $1,000,000 preferred stock. The Projectile Company are capitalized at $500,000, all common stock.

The A. & F. Brown Company, founders and machinists of Elizabethport, N. J., have awarded contracts involving an amount in the neighborhood of $25,000, covering alterations and additions to their foundry. They will during the next 60 days make further contracts for a new machine shop to be of brick and steel construction, 80 x 150 feet, the erection of which will probably not be commenced until the latter part of February. They have not as yet decided as to the quantity and line of machinery which they will require.

The United Fruit Company, 21 State street, New York, have placed a contract with the American Supply & Construction Company, 120 Liberty street, covering three engines of the tandem compound condensing type, three water tube boilers, condensers, heaters, pumps, separators, piping belts, &c. This machinery will be used to furnish power for an electric light and power plant on the United Fruit Company's banana plantation in Costa Rica, Central America.

The Philadelphia Roll & Machine Company of Philadelphia are about to make improvements to their power plant, and desire bids for a boiler and engine.

Plans are in course of preparation by F. E. Chambers, engineer United States Navy, stationed at the League Island yard, for a $15,000 addition to angle shop No. 14. The building will be of brick and steel fire proof construction. The plans will be ready for estimates in about two weeks.

On October 11 next the Navy Department will receive bids for constructing a concrete and granite drydock, exclusive of pumping plant and caisson, at the Navy Yard, Charleston, S. C. The authorized cost of the entire work is $1,250,000. On September 13 the Navy Department will receive bids for a similar dock at the Navy Yard, Norfolk, Va. The authorized cost of this work is $1,200,000.

The following bids for steel plate were opened at the Navy Department, August 19:

52,245 pounds of 5-pound steel plates, delivered at New York and League Island, $612; by W. E. Clark & Co. of Boston.
1,095,025 pounds of plates, delivered at Boston, League Island and New York, $26,773; by the same company.
264,459 pounds of plates, delivered at Mare Island and Puget Sound, $8727; also to the same company.
22,620 pounds galvanized steel plates, delivered in New York, $1357; by B. Wallace & Co., Baltimore, Md.

The following is a list of the machine tools and supplies required for the Navy Yard, Puget Sound, Washington, under bids to be opened September 9:

One heavy double surfacer, two pony or panel planers, one planing and joining machine, one four-sided molding machine, one two-spindled upright molding machine, one panel raiser, one wood turning lathe, one power feed rod machine, one automatic self-feeding circular ripping saw, one railway automatic circular cutting-off saw, one swing cutting-off saw, one 60-inch band resawing machine, one 42-inch scroll band sawing machine, one scroll saw, one automatic blind stile mortiser and border, one combined vertical and horizontal boring machine, one box joint machine, one wood trimmer and stand, two bench wood trimmers, one automatic combination sharpener for circular and band saws, one hand sharpener and gummer, one automatic planer knife grinder, one metal band saw for brass, three 12-inch sensitive drills, one 13-inch monitor lathe for brass, two 22-inch upright drill presses, one buffing lathe, one double dry plain and surface grinder, one grinder with belt strapping attachment, one twist drill grinder, one center grinder, one plain double dry grinder, one universal milling machine, one hydrostatic wheel press, one exhaust fan, one monitor lathe, one tool-room lathe, one screw cutting lathe, one 1¼-inch double bolt cutter, one 1½-inch single bolt cutter, one metal cold saw cutting-off machine, one post drill, motor driven, one horizontal drilling and tapping machine, one heavy double punch and shear, one 600-pound single frame steam hammer, one bolt makers' furnace, one gang of paint mills, one twin lead and paint mixer, one red lead putty mixer, one 15 horse-power vertical motor, two 15 horse-power motors, one 12 horse-power motor, three 10 horse-power motors, two 6 horse-power motors, four 5 horse-power, four 3 horse-power, and one 2 horse-power motors.

The Alberger Condenser Company, 95 Liberty street, New York, have the contract for three condenser plants for the Belt, Light & Power Company of Lead, S. D. The engine will be a De Laval turbine of 500 horse-power. They also have a contract for condensers for the Pennsylvania Sugar Refining Company of Philadelphia, who will use one 800 horse-power and one 400 horse-power De Laval turbine. Both of these plants will be high vacuum system, surface condensers.

Cleveland Machinery Market.

CLEVELAND, OHIO, August 25, 1902.

During the past two months it has been the general expression among Cleveland machinery people of all classes that the warm weather and vacation season have had little or no effect upon business, but now that vacation days are about over there are many who report a decided improvement in the volume of business at hand. Certainly the indications are that the general prosperity of the past two or three years is to be equalled if not outdone during the coming fall and winter. Reports of extensions and improvements are becoming more numerous than ever and in a great many cases they come from people who have already made extensions within a year or two. Those who have been holding up ordering material for new extensions because of high prices appear to be coming to the conclusion that figures are likely to grow higher instead of lower for some time to come and that it will be folly to delay any longer. A prominent manufacturer in discussing the outlook, said to *The Iron Age* man to-day: "The brightest of the situation lies in the fact that reports from the West indicate that crops will be heavier than in many years. Good crops mean busy railroads, and busy railroads mean improved conditions everywhere. The farmers throughout the West have had good crops for two or three years back, and the majority of them have paid off their mortgages. This year prices of grain are high and they will have more money to spend than in many years; this, too, is bound to improve the general situation."

"More business than can be taken care of," is the general cry. One example which the writer has in mind forcibly illustrates a situation which is becoming common. A concern manufacturing a staple line of machinery has in years past done a business of about $165,000 per year. At the present time this concern has over $90,000 worth of orders on its books which have not been touched, and the goods turned out thus far amount to more than last year's output.

The machinery dealers say that the business this summer has been far ahead of the same period last year, and this month there is considerable improvement over last month.

The S. M. York Machinery Company say their business is far ahead of last year at this time, but orders are coming singly rather than for large equipments.

The Marshall & Huschardt Machinery Company's branch say that August will show up better than the same month last year and considerably better than July of this year. They have just sold an outfit of tools to Bonnot Company of Canton, several special 26-inch Bullard lathes to the Jeffrey Mfg. Company, and a number of electrically driven tools to the Wm. Tod Company of Youngstown.

E. I. Leighton, formerly with the Cleveland Punch & Shear Works, has been elected general manager of the Cleveland Machine & Mfg. Company, and will manage the affairs of the company. They are engaging quite extensively in heavy jobbing work and are manufacturing a line of heavy punches and shears to the order of a prominent dealer. Among other work they are building four large transfers for the Colorado Fuel & Iron Company, and a wire fence machine for Bowler & Roberts of this city. This machine has a capacity of 5 miles of woven wire fence per day, and weaves 13 strands at once. They are building an extension, 40 x 120, and will install an engine, boiler, lighting generator, air compressor and oil furnace for heating forgings. They have not yet closed for any of this equipment. They are installing a 2500-pound Chambersburg steam hammer.

The Atlas Car & Mfg. Company are busier than ever before and are accepting orders for heavier cars than heretofore. They are building a complete industrial equipment of cars and tracks for a Pittsburgh rolling mill, and are equipping the steel plant of the National Enameling & Stamping Company with new steel ingot and mold cars. They are building a number of 20-ton all steel automatic dump cars for handling coke, and have recently shipped a number of ingot mold and slag cars to London.

The Machinery Forging Company, recently organized,

have erected a shop near the corner of Hamilton and Marquet streets, and will produce machinery forgings of all kinds up to 1000 pounds. They are installing an 1100 pound and a 2500 pound steam hammer and will commence operations in the near future. The management of the company is in the hands of H. D. French, formerly superintendent for Jos. Dyson & Sons, who are in a similar business in this city.

The Garry Iron & Steel Company have recently gone into the manufacture of penumatic lifting jacks for railroad work and have placed the agency for these goods in the hands of the Ludlow Supply Company, Electric Building, Cleveland.

The Acme Machinery Company, manufacturers of nut and bolt machinery, say that business has kept up to the high mark this summer, and the outlook for the fall and winter indicates heavier business than ever. They are receiving orders from England, France, South America and Australia, but the other Continental countries are quiet. They will shortly announce a nut tapping machine of new design and showing decided improvements. They are rapidly completing their new office building, and the large addition to their factory, and expect to occupy the former within the next three or four weeks.

The American Machinery Company, who do jobbing work of all kinds, have recently shipped six rolling rod wheels for rolling mils to the American Steel & Wire Company. They are building a second order of transfer tables for the Inland Steel Company of Chicago. For the La Belle Iron Works of Steubenville they are building a motor drive, and for the Colorado Fuel & Iron Company, a large set of shears. To the same company they will shortly ship a lot of ingot buggies and hydraulic tilts, this being the second order from the same people. The American Machinery Company are preparing to go into the manufacture of a new line of heavy machine tools, and to take charge of this work they have secured the services of G. D. Philips, formerly with Warner & Swasey of this city.

The Cleveland Stampings & Tool Company have purchased the property adjoining their plant at present occupied by the Snyder-Hughes Pump Company. The addition will more than double their present capacity, which was increased only a few months ago by the erection of a large building. The Snyder-Hughes Pump Company will shortly make an announcement relative to their plans. They will go into a larger factory.

The Peter Gerlach Company, manufacturers of barrel and stave machinery, recently shipped an outfit of 14 stave machines capable of producing 500 cement barrels per day to a concern at Barcelona, Spain. Business with them is usually very quiet at this time of year, but it has improved considerably during the past month.

The C. O. Bartlett & Snow Company are building a dryer outfit for drying 100 tons of powdered coal per day for the McCormick Harvesting Machine Company of Chicago, who will use dried coal dust in their annealing furnaces. They are erecting a similar outfit for the Indianapolis (Ind.) Water Works plant. Bartlett & Snow Company are now in their new plant, which gives them more than twice the capacity of the old plant. They are installing an Ingersoll-Sargeant air compressor outfit, with pneumatic tools, a Rockwell rivet heater, besides a number of new machine tools. They will build a large dryer outfit for their own use, and will be the first in Cleveland to use powdered coal under their boilers. They claim this system is rapidly growing in popularity, since it effects a saving in coal and solves the smoke nuisance.

Thomas Scott, formerly with Horseburgh & Scott, has organized the Scott Machine Company, and opened a shop at 26 Michigan street, where he will do jobbing work of all kinds. He will install considerable new machinery.

The Vulcanus Forging Company are badly cramped for lack of space, and they have prepared plans for a plant, to be more than double the capacity of the present. They are open for propositions for the sale of their present plant located on Hamilton street, near Case avenue. They have practically decided to locate outside the city on account of high taxes and high insurance, and are negotiating for a site in the vicinity of Cleveland.

F. H. Bultman & Co. are so busy with the work of gear cutting that they are unable to pay much attention to the production of their gear cutting machines. They are increasing their facilities by installing a machine to cut 50-inch gears.

The Born Steel Range Company have commenced work on an addition to their plant, which will greatly increase their capacity.

The Providence Engineering Company of this city have submitted prices on three horizontal cross compound condensing Rice & Sargent engines, at a total cost of $29,250, for the proposed municipal lighting plant at Columbus. This was the only bid, and it will be unavailable, for the reason that litigation has forced the Columbus officials to reduce the estimates of their plant from $175,000 to $110,000. New bids will be called for for all the required equipment, which includes engines, boilers, generators, &c.

The Eastman Metallic Body Company, who manufacture metallic bodies for automobiles, are handicapped through lack of space, and are desirous of receiving proposals for the location of their plant in some enterprising manufacturing city in this portion of the country. The company are enjoying a profitable business on a small scale.

The Lincoln Stove & Range Company, having factories in Toledo and Detroit, with headquarters in the latter city, will locate a new plant in Fremont, Ohio. The company manufacture stoves and steel ranges of every description. Contracts have been placed for the erection of the plant, which will include a machine shop, 40 x 70 feet, two stories high, and a foundry, 70 x 100 feet, one story.

The Schwab Safe & Mfg. Company of Fostoria, Ohio, have changed their name to the Atlas Safe Company. E. W. Ervin is president of the company, Mr. Schwab having sold out some time ago, to engage in similar business in Toledo.

The Bellefontaine Foundry & Machine Company of Bellefontaine have been incorporated with $50,000 capital stock by W. W. Fisher, James M. Elrite, R. F. Tremain, John E. Welsh and Charles Harnell.

Philip Hughes of Portsmouth, Ohio, has secured a contract for installing the machinery and electric light plant for the Hill Coal Company at Monroe Furnace, near Portsmouth.

Two new furnaces and an extension to the power house are to be erected at the plant of the Lorain Steel Company, Lorain. Work on the improvements will start at once. This will give the plant four furnaces.

The Craig Shipbuilding Company of Toledo, an independent concern, are getting their full share of the lake business, and are invading the seagoing trade. Last week they launched at their Toledo yards the tank steamer "Toledo." The vessel has a tonnage of 3500, and is designed to carry 900,000 gallons of oil in addition to her fuel. She will run between Port Arthur, Texas, and Marcus Hook, Pa. The "Toledo" is 263 feet long, and will load to 22 feet. She will have two boilers 14 feet in diameter and 12 feet in length, and each will have three corrugated furnaces. Her engines will be of the triple expansion type, 21, 37, 58 x 40, with an indicated horse-power of 1500, capable of a speed of 10 knots an hour when full loaded. The vessel is divided into eight tanks, and extra precautions have been taken in her construction to prevent explosion from gases which generate from her cargo. She is owned by the Sun Company of Pittsburgh. Within the past week the Craig Company have secured a contract from the Grand Trunk Ferry Company of Milwaukee for a large car ferry. She will be 300 feet long, 54 feet beam, and will have a capacity of 38 freight cars and 1000 passengers. She will cost $300,000, and will ply between Milwaukee and Grand Haven. To provide for increased work, the Craig Company have placed a contract to enlarge their dry dock, making it 525 feet long, which will accommodate any vessel on the great lakes, and enable them to take on the heaviest repair work. The dock will have but one rival on the lakes.

The McMurray Sulkey Company of Marion, Ohio, have prepared plans for an addition to their plant. The buildings will enlarge their facilities considerably.

J. E. Bell, formerly sales agent of the Youngstown Mfg. Company of Youngstown, and Charles R. Roof, formerly superintendent of the same company, have formed a company for the manufacture of nuts and bolts, and have decided to locate their plant at Cuyahoga Falls, near Cleveland.

The Seiberling & Miller Company of Doylestown, manufacturers of reapers and mowers, will erect a large addition to their plant. Their trade this year has been the heaviest ever experienced.

The Pennsylvania Railroad Company are pushing work on their new shops at Columbus. The erecting and machine shop will be 80 x 660 feet. All machinery will be electrically driven. The power house is nearing completion, and in it are being installed four 300 horse-power Stirling boilers and three 500 horse-power engines.

The city of Cleveland have had plans prepared for a double roller lift bridge for middle Seneca street. It will cost $150,000.

The Largest Roll Ever Cast.—The A. Garrison Foundry Company, South Side, Pittsburgh, recently cast what is said to be the largest roll ever turned out by any concern in this country or abroad. The diameter of this roll when turned was 38 inches and it is 140 inches long; the weight in the rough was 58,000 pounds; the necks of the roll were 26 inches in diameter and 22 inches long; the diameter of the wobbler is 22 inches and length 15 inches. This roll was turned out for the Lukens Iron & Steel Company, at Coatesville, Pa., who are making large additions to their plant, as noted in our issue of last week. The A. Garrison Foundry Company have recently made extensive improvements to their foundry and machine shops and have added a good deal of new equipment, consisting of heavy modern iron working tools, which will very much increase their capacity for the manufacture of rolls and rolling mill equipment of all kinds.

The Boiler Problem.

BY EGBERT P. WATSON.

Viewed superficially it would seem a very simple matter to make a vessel to supply steam constantly in proportion to its capacity for an engine, but the experience of a century or more has shown that there are difficulties to be solved that an inexperienced person has no idea of. It is easy to construct a strong boiler that will be safe under all circumstances, but when it comes to getting high efficiency in evaporation with an economical consumption of coal, and equal performance under all conditions of weather and situation, vexatious difficulties are encountered at once. Almost any form of steam generator will perform well when new and clean, but after a few months, when the fire surfaces and water spaces get dirty, its efficiency degenerates rapidly. Bearing upon this point it is, in a sense, surprising that there is so little difference in evaporation, or pounds of water boiled into commercially dry steam, in modern boilers after continued service over the practice of 50 years ago. There is a slight gain of 2 pounds or so, but this is very little when we consider the better knowledge we have of burning coal to advantage. Half a century ago it was common work to evaporate from 5 to 6½ pounds of water with 1 pound of coal in a plain cylinder boiler, and the average to-day all over the country will not exceed 8 pounds at the best, taking good and bad management together. There is no lack of reports of performances of boilers evaporating 10 pounds of water per pound of coal daily, but these are exceptional cases; the others which do not run over 7 pounds of water per pound of coal are far more common.

All the conditions governing the turning of water into dry steam are not yet known; when they are we shall be able to comprehend why small parcels of water traversed by large volumes of heat are not more or less instantaneously vaporized and the efficiency markedly increased, or at least in some proportion of the fire and water surfaces and areas. The water content of a boiler has but slight influence upon the facility of getting steam, provided that the said water is in circulation and is kept moving over the hot surfaces, but the water content has a decided action upon the quality of the steam furnished, whether it be wet or dry. This is shown in the so-called Scotch boiler, where there is a large body of water below the fire; this water remains only hand warm for a long time after starting fires, but when means are taken to cause this inert water to traverse the hot tubes and plates the time to get steam is much reduced.

If the boiler question was a simple one in all of its aspects there would be fewer patents taken out, and the naval authorities of the whole world would be able to fix upon one type as the most desirable, but the question is very far from a solution at present. Broadly, there are only two distinct types—fire tube and water tube—and both have certain features which render them extremely desirable, but there are faults common to both that keep chief engineers guessing as to which shall be adopted. There are innumerable variants in each type, so that it is apparent to even a layman that a choice is difficult. It can be said that no one type is perfect in itself, the only point to be solved being which disadvantage or weakness is likely to prove the least dangerous in action. One bad feature is common to all boilers, and that is the difficulty of keeping them clean. On long voyages, or continued service, it is impossible in war times to throw the boilers as a whole out of service, for there is no knowledge that the full power may not be needed at a moment's notice, and no boiler can be cleaned without opening it up.

In long voyages of merchant ships one boiler may be cleaned at a time, but this involves ample boiler power so that the ship may not be unduly delayed. Where boilers cannot be cleaned at all, even when in dock, the life of them is far more impaired than by years of active service in proper condition. This disability is strikingly apparent in some new designs of boilers, the authors of them being ignorant of or indifferent to the necessity for access to all parts without dismantling the structure. Facility of repair is very essential also, without destroying sound portions to get at the unsound.

Upon this head it makes an old time boilermaker stare to see some details which are used upon modern boilers in attaching tubes to fire boxes. One such detail consists of hundreds of couplings and screwed unions, all of which are directly exposed to the full force of the furnace gases. These in a short time are sure to burn fast, so that they cannot be taken down, which last is the only reason for the design.

The English Admiralty Inquiry.

An exhaustive inquiry into the several types of marine boilers has just been concluded by a Boiler Committee ordered by the English Admiralty Board for the purpose of adopting some special form of generator for war vessels; this commission was composed of engineers of wide experience, and they went into their task most thoroughly in all points affecting constant service and other features of importance, but the result was disappointing so far as the object for which the commission was created was concerned, no type of boiler being found which was better than other types. Some years ago it was hoped that the Belleville boiler, a French invention, comprised the essential features of an all around boiler, and several thousand horse-power of it were installed in English warships, not without strenuous objections, however, from makers of cylinder boilers. After fair trials in service and in experiment, this boiler proved to be as unsatisfactory as the others in use, and an adverse report has been rendered by the commission. The actual verdict is as follows:

"The commission fully recognize that the Belleville boiler, when new and in good condition, is a good steam generator, but its rapid loss of efficiency in ordinary work in commissioned ships, the serious character of the defects which have been developed in it and the great care required in its management render it, in the opinion of the committee, undersirable to fit any more of them in H. M. Navy."

The commission also says that the circulation is defective and uncertain, and that the gauges do not indicate correctly the amount of water in the boiler, which has led to serious accidents. It also says that the upkeep of the Belleville boiler has proved very expensive, and ships with such boilers cannot keep the sea so long without repair as with the Scotch boiler in general use. There are many more specific defects mentioned, but those here given will suffice; the commission is fair enough to say that possibly the same troubles may be encountered with other water tube boilers. It is only just, however, to say that the extended use of the Belleville boiler in vessels of the Messageries Maritime, and in several foreign navies do not warrant the wholesale condemnation of the English Commission, which may or may not have been more or less influenced unconsciously no doubt by the fact that the Belleville boiler is of the water tube type. The establishment of any boiler of this class in general use would destroy the value of many English boiler plants fitted with machinery and tools for the manufacture of fire tube cylinder boilers. Hundreds of thousands of dollars worth of very expensive fixtures would have to be discarded as worthless, and capital rendered valueless for the time being until reinvested. Considerations of these facts must have some weight at times.

Meantime all the nations of the world are rapidly increasing their naval force; ships are being constantly added and boilers of some kind must be put in them, but no one can say exactly whether they should be fire or water tube types. It is manifestly impossible to wait until time shall settle the question, which seems to be of the nature of Hobson's choice.

The Modern Boiler Superior.

The foregoing remarks deal principally with marine boilers, for these in all that concerns great power in the least cubic feet, the best construction with the fewest details and absolute immunity from disastrous explosions embody the highest type of steam generator and are also adapted to stationary work. This last cannot

be said of land boilers for reasons that are plain to all. But in either type or class of boiler, those made to-day are far superior in every essential to the boilers of half a century ago. No comparison is possible from any aspect of the subject. The mandatory requirements of the Treasury Department in the matter of tensile strength of material for marine generators have resulted in the adoption of its standard by the trade everywhere, so that comparatively few iron boilers are made. Where this material was used 50 years ago the strength was a variable quantity, and if ever tested it must have been done by some methods that did not give accurate results, for there were no testing machines in those days to weigh the elasticity and strength of each sheet. Besides this feature of modern boiler making—better material—the improved tools employed and more conscientious workmanship have resulted in raising the character of all boilers so that it is now beyond reproach. Modern appliances have rendered it poor economy to slight a job by reason of the expense entailed in doing it properly, and steel is cheaper than iron ever was for equal quality. Machine work is the rule now and hand work the exception, and the former is far ahead of the latter in quality. Especially is this true in the matter of flanging. Of old this was the most costly job in the shop, but for ordinary straight away work, heads of domes and shells, no boilermaker attempts to do such work by hand at the present time for the reason that he can get these parts direct from the steel mills at a very small advance on the price of the steel itself, and far truer in every essential. Chipping and calking and driving rivets are also machine work, executed at a fraction of the cost of hand work. Riveting machines are marvelously designed to get at all portions of the structure, so that very little purely hand work is required. In addition to this, certain details of boilers and their fixtures are furnished complete, ready to be riveted in place. Braces, crow feet, hand hole plates and manhole plates, with crabs and bolts attached, everything on them that the law requires except gaskets, can be had in improved patterns and wholly of steel throughout at much less expense to the boilermaker than he could construct them himself. The modern steam boiler is far ahead of its congener of half a century ago.

The Problem of Economic Performance.

But, as the caption of my article says, there are plenty of problems to be solved as regards its economic performance. It may be that this lies in directions far apart from design. Certainly the realm of this feature of the subject has been exhaustively ransacked. If there is any form into which tubes have not been twisted and bent so that the heat must strike and traverse them from end to end I have not seen it, and I keep abreast of all the patents published. If there is any scheme to entrap the heat by baffle plates or dodgers of every sort, so that it cannot get out of the boiler until it has parted with every unit available for steam making, I have not seen that either. Every possible proportion of grate to heat surface and fire box to tube or flue surface has been instituted, but the results average singularly equal as regards water boiled into dry steam. There are boilers, it is true, which get away with quantities of water per pound of coal, but some of this water is entrained along with the steam, and requires strainers (separators as they are known in the trade) to wring some of the water out before it gets to the engine, but there is no economy in that kind of engineering. A separator on a steam boiler is positive proof that the boiler is not working properly from one cause or another, otherwise the water would remain where it belongs, and not try to smuggle itself into the cylinder where it does not belong. I have no calorimeter tests at hand to which I can refer reliably to show the average condition of the steam furnished by the average boiler—if any experiments in this direction were ever made—but one fact in regard to the experiments made by the English Commission previously mentioned shows that in some types of boilers immense quantities of water are delivered to the boiler which the engines never account for and which cannot be traced as to their loss by exterior leaks. Hundreds of tons of water disappeared from one kind of boiler on a short voyage from England to Gibraltar from some cause not reported. It is not unfair to assume that it went over with the steam and thence by devious routes to that financial scrap heap, the condenser.

A benefactor has been defined as one who can make two blades of grass grow where but one grew before. This may be desirable or not, according to whether grass is essential, but the man who can make a steam boiler turn 14 pounds of water into commercially dry steam, holding, say, only 1½ to 2 per cent. of moisture, will have a much greater reward than benefactors generally receive.

HARDWARE ADVERTISING.

BY W. F. B.

MY advertisements are made the size of the average Hardwareman's newspaper space. In my opinion the usefulness of an ad. is commensurate with its size. But the merchant does most of his advertising after the plan of the boy getting his lessons—because he has to.

A Compulsory Advertiser.

He, the merchant, has had the idea drilled into him by the enterprising newspaper advertiser that he must advertise or ruin stares him in the face. So he reluctantly takes a space, a small space, and writes his ad. He may have a lot of Paris Green which he would like to sell. So he tells the people, through the press, that he is selling Paris Green. Then he is happy in the knowledge that the enterprising newspaper man is well rid of and forgets it all. The time for Paris Green to be sold comes, and slowly goes, and still the Paris Green stares the public in the face. It might stay all winter if somebody didn't suggest to him that it was somewhat past the time for Paris Green, and he had better advertise Snow Shovels.

An Expert 200 Miles Away.

Such writing as this will rile somebody, so we will turn to another kind of advertiser. This is the man who reads in a magazine that Mr. Smooth of New York will write his advertisements for him at so much per, and he can double his trade directly. So he enters into correspondence with Mr. Smooth and makes a contract. Then, from 200 miles away from his trade, the merchant gets his ads and his cuts, and in due course of time he gets his bill for the same. His trade does pick up a little, because Mr. Smooth gets out some very fine cuts, and they take quite a lot of space in the newspaper. But when he figures up at the end of the year Mr. Smooth has made the money, not the merchant.

Another Way.

Then he tries another idea. He buys a half dozen cuts. *The Iron Age* sells them, and he takes 4 inches in one column of the papers of his town. Then with the cut at the top he tells the people that he sells the above goods, at such a price, and that he would be glad to have the public come to his store and see them. The next week he changes cut and subject, and remarks that he will show the Apple Parer in operation if the public would like to see it. That is my ideal of an advertisement. Always a cut when it illustrates the subject. Not too much talk. Always the price if possible, and an invitation to call is never amiss.

Demonstrations

are good. The dry goods people are not the only ones who can have demonstrations. Show up the Meat Choppers, the Apple Parers, and it wouldn't be such a bad thing to demonstrate the Freezers. The manufacturers of these things have salaried men doing this, and when they come your way clear away a space in the front of the store and put them at it. The ladies have a warm spot in their hearts for demonstrations, and they will all drop in.

Advertise to deliver all your sales, and if you have a large section give your customers their car fare on sales of a certain amount. That applies to cash sales only.

HARDWARE.

Cogent arguments can be advanced in favor of a middle ground between too low and too high prices. One method of pricing is as unsatisfactory and leads to as undesirable results as the other. The merchant who charges too little for his goods does an excessive amount of work for inadequate pay. He must exercise such economy in conducting his business to make ends meet that he is unable to appropriate what he should for advertising or in the employment of competent help. His business may grow because of the attraction of low prices, but this simply results in overwork for himself and his force, and the end of the year finds him with a very small surplus in comparison with the volume of business which he has done. We have in mind a conspicuous example of this type of merchant. He was one of the most industrious and painstaking business men to be found anywhere, working early and late, and insisting on all his employees following his example. It was a cardinal offense in his establishment for a salesman to endeavor to get more than 10 per cent. profit from a customer. It was his habit every day personally to go over all bills for the express purpose of determining whether the prices made were cheap enough, and quite frequently the bills were corrected by the substitution of lower figures. If the market advanced and he had a good stock of any merchandise purchased at a low price, his prices were not advanced to conform to the market, but the old rate prevailed until the cheap stock was closed out. His sympathy was wholly for the buyer, and his constant fear was that some customer might think he was being overcharged. The consequence was that he never made sufficient profits on an advancing market to cover his losses when a declining market caught him stocked at high cost and he was obliged to reduce his selling prices to meet changed conditions. He started with ample capital, which enabled him to continue in business for a number of years, but eventually his capital was exhausted and he failed, to the great regret of his customers, but the delight of his competitors, who had so long found him a thorn in their sides.

Strongly contrasted with such a man is the merchant who seeks to obtain an exorbitant profit on his goods. It may be possible occasionally to charge 15 cents for an article bought for 3 cents, but this principle of doing business may be expected to drive away customers who will search for a merchant with more reasonable views of a fair profit. Even if a merchant of this character may make a leader of some articles and sell them close to cost to attract trade, his excessively high prices on other goods will be perceived by his customers and they will go elsewhere for such merchandise. High prices on small wares have done much to build up department stores and catalogue houses. The little articles are those in greatest demand, and here the department store finds its most fruitful field. It must be borne in mind that excessive profits aimed at in these days do not simply turn customers to other Hardware stores, but are likely to drive them to stores which are not strictly identified with the Hardware trade. The Hardware merchant who aims to secure a reasonable profit on everything he sells not only serves his own trade well and establishes for himself a permanent footing, but also does much for his colleagues in the Hardware trade at large by keeping buyers of Hardware in the habit of dealing with Hardware stores.

A persistent demand exists for the standardization of catalogues. This demand comes not only from merchants but from purchasing agents of railroad companies and other large corporations consuming a great variety of goods. They find it exceedingly inconvenient to arrange their catalogues systematically so as to permit ready reference. It is true that a great many catalogues now show some approach to uniformity, as a result of the continued agitation of this question, but there are very many others of motley size. Some are tall and thin. Others are short and very stout. Some are of such small size that they can be conveniently carried in the pocket. Others are so huge that a dictionary stand is required to handle them conveniently. The variety in size causes great difficulty in the arrangement of a collection of catalogues on shelving or in a bookcase. Some cabinets have been constructed with a special view to holding Hardware catalogues, but these are not available for every catalogue that comes to hand. The suggestion is made by some members of the trade that manufacturers and jobbers endeavor to conform to what they observe is the most popular size among houses in their particular line. It may not be practicable to have all trade catalogues of precisely the same size. What is advantageous or especially convenient for one line of business may not be strictly appropriate for another line. Nevertheless, taking one particular branch of trade, those engaged in that line can adopt a size suited specially to their requirements. This is an era of standardization, and the principle has been applied to so many things in so many different lines that it is absurd to say that catalogues are an exception. If they were more nearly uniform it is safe to say that many catalogues would be preserved for reference which now speedily find their way to the waste basket, despite their embellishments. It would certainly seem possible to have only three or four sizes instead of the great variety now in use.

Condition of Trade.

Seldom have general conditions been so satisfactory. The volume of business is now reported to be increasing from week to week. The distribution from jobbers to retailers is on a heavy scale, as shown by the urgent demand for manufacturers to hurry shipments on back orders. The movement in Builders' Hardware is reported larger than at any previous time. Fresh orders are being booked from buyers, who say that they had supposed themselves amply supplied for the fall trade. These orders are coming from nearly all sections of the country, but are especially heavy from the Northwest and the Pacific Coast. Building operations are being pushed actively in the strictly agricultural sections of the country as well as in the cities. The improvements thus under way are increasing the demand for Nails and other staple goods, and some branches of trade which have recently been quiet are now taking on improving conditions. It is observed that merchants who have had sufficient faith in the stability of values and the maintenance of a good demand to keep well stocked are now reaping the reward of their confidence, while those who hesitated, looking for a reaction, are suffering from scanty supplies which cannot be quickly replenished. A significant feature of current business is the equanimity with which any weakening in price on some staples is regarded. It seems to breed no general distrust, but is simply considered as an incident peculiar to its own line. Changes thus made, however, are not important, and probably more advances than declines are to be noted. Consolidations of manufacturers of sundry articles, such

as Steel Goods, Axes, Axe Handles and Grindstones, and closer relations, as in the case of Scythe manufacturers, promise a stiffening of prices in the products thus affected. The developments in this direction are therefore interesting and will be closely followed by the trade.

Chicago.

(By Telegraph.)

Both jobbers of Hardware and manufacturers' agents have experienced a further gain in the volume of business during the week. The increased activity has been especially noticeable in heavy lines, such as Tin Plate and the higher grades of Sheet Iron and Sheet Steel, more especially Refined and Planished Iron and Smooth Steel. These latter grades are unusually scarce, much difficulty being experienced in obtaining ample supplies at the present time. There are also large orders for Nuts, Bolts, Screws, &c., from carriage and wagon manufacturers, and the better demand for Small Angles has been marked. The shipments of fall goods have become more general and have increased in volume. The recent advance in the price of Axes seems to have stimulated rather than reduced sales. The difficulty of obtaining goods promptly is exemplified by an effort made during the week to obtain samples of Pocket Knives for taking fall orders. Manufacturers applied to reported that they would be unable to comply with the request before October, and this seems to be the general experience. Independent manufacturers of Shovels are reported to have reduced prices 25 cents to meet the recent reductions made by the associated manufacturers, and each one is said to be preparing or has already prepared a special line of Shovels to meet competition. As a rule, however, these cheap lines do not meet with as much favor as do the more reliable goods, indicating that buyers are discriminating and possessed of ready funds. Some makes of Gimlets are said to have been advanced, as have also certain lines of Coffee Mills, Sad Irons and other specialties. In Builders' Hardware, stock orders while not large are urgent, and lines are so broken that it is almost impossible to make up an order without reference to the factories, which are so far sold ahead that prompt attention is almost impossible. Under the circumstances buyers in many cases must be contented with the finish that local stocks afford. The demand for Barb Wire has increased and the larger sales of Nails previously reported are well sustained by additional country demands. The regular meeting of the Wire Nail manufacturers will probably be postponed this month on account of the absence of many on vacations. Some important mills are said to be sold up on Upholstery Springs for the season. The demand for Music Wire, Pump Rods, Shafting, &c., has improved, notwithstanding the liberal orders already booked.

St. Louis.

(By Telegraph.)

The offices and warehouses of the jobbers in this city are particularly busy places these August days, and it is highly gratifying to report business on such a large and increasing scale. The records of other seasons are being eclipsed and the scope of the buying movement is wide. While the volume of trade in the heavy department is not progressing at such rapid pace the increase is a steady one, and with the approach of fall the demand is expected to be well in line with that of past seasons. Prices in all lines are firm and in some directions advances would not be a surprise. Corn crop reports continue for the most part encouraging, but there is no doubt a less quantity of rain and more sunshine would relieve the minds of farmers. With no unfavorable conditions, such as an early frost, the returns to the farming community will be among the largest in the history of the West.

NOTES ON PRICES.

Wire Nails.—The fall demand for Wire Nails has not yet begun. The movement is, however, in fair volume for the season. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—Persistent reports have been in circulation during the week that a reduction in the price of Wire Nails would be announced about September 1. As far as can be learned no authority for such a statement exists. Prices are maintained at the following quotations: Single carloads, $2.20; small lots from store, $2.25 to $2.30.

Chicago, by Telegraph.—Further liberal orders have been placed by large jobbers with manufacturers, and the jobbing trade also has given signs of improvement, the demand from the country being more generous. Sales of single carload lots have been made at $2.15 to $2.20, and in small lots from store at $2.25 to $2.30.

St. Louis, by Telegraph.—The movement of Wire Nails is better. Prices continue on the same basis, carload lots at $2.25 and small lots from stock at $2.30.

Pittsburgh.—There is no increase in demand, which is only for small lots. An improvement in demand for Wire Nails is expected just as soon as fall trade opens up, which will likely be next month. Prices are fairly firm, being shaded only in exceptional cases and to very slight extent. We quote Wire Nails at $2.05 in carloads, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Cut Nails.—Manufacturers are falling somewhat behind their orders, and railroads are not prompt in making deliveries. The regular monthly meeting of the Cut Nail Association will be held this week. Quotations are as follows: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Local conditions are unchanged, with a moderate demand. Quotations for carloads and less than carloads are as follows:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago by Telegraph.—There has been a fair demand for both Iron and Steel Cut Nails, with moderate offerings of all kinds. Carload lots are quotable at $2.20 base, and small lots at $2.30 base in a jobbing way from store.

St. Louis, by Telegraph.—The demand for Cut Nails is fair. The quotation from jobbers' stock for small lots continues at $2.40.

Pittsburgh.—There is a fair demand for Steel Cut Nails, which are held at $2.05, base, in carloads and $2.10 in less than carloads, plus freight in Tube Rate Book to point of destination.

Barb Wire.—The demand is limited, while prices are fairly well maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carload lots	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carloads	2.80	3.10

Chicago, by Telegraph.—Both manufacturers and jobbers have experienced an improved demand and the market has remained steady. Galvanized is selling at $3 to $3.05, and Painted at $2.70 to $2.75 in car lots, with 5 cents extra for small quantities from store.

St. Louis, by Telegraph.—A slight increase in the demand for Barb Wire is to be noted. Prices are holding firm, Painted at $2.90 and Galvanized at $3.20 in small lots.

Pittsburgh.—Demand is very light, but prices are fair-

ly firm, as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—An ordinary demand is all that can be reported, but prices remain steady. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base				$0.40	extra.
10	$0.05	advance	over	base	.40	"
11	.10	"	"	"	.40	"
12 and 12½	.15	"	"	"	.40	"
13	.25	"	"	"	.40	"
14	.35	"	"	"	.40	"
15	.45	"	"	"	.75	"
16	.55	"	"	"	.75	"
17	.70	"	"	"	1.00	"
18	.85	"	"	"	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—There has been less animation in the market, but a fair movement. The jobbing order trade has been met at $2.20 from store. Car lots are selling at $2.10 to $2.15 on track.

St. Louis, by Telegraph.—Plain Wire is in moderate demand, with some new inquiry coming into the market. The jobbers' price in small lots from store for No. 9 is $2.25 and Galvanized $2.65.

Pittsburgh.—Demand is mostly for small lots and there is no change in prices, which remain at $2, base, for Plain Wire and $2.40 for Galvanized in carloads f.o.b. at mill.

Sewer Pipe.—The demand for Sewer Pipe is excellent, and the quotations to be found under Current Hardware Prices represent the market.

Springs.—The price of Carriage and Wagon Springs was advanced ⅛ cent at the last meeting held by the manufacturers, making the base price 4⅝ cents per pound.

Cordage.—Sisal Rope is not quite so strong this week, quotations ranging from 9¼ to 10 cents per pound, on the basis of 7-16 inch and larger, according to makers. Manila Rope, on the same basis, ranges in price from 12½ to 13 cents per pound.

Glass.—A more hopeful view is taken of the future of the market. It is understood that the Independent Glass Company have agreed to co-operate with the Federation Window Glass Company when the latter succeeded in signing 700 pots. It is reported that in addition to this the Federation Company should forfeit $300 per pot should the agreement be violated. If this plan proves successful it is expected that very little, if any, new Glass will be on the market before October 7. This would give the combined companies an opportunity to dispose of their stock of Glass on hand, and probably avert a price war. The Jobbers' Association quotations are as follows for single and double strength Glass:

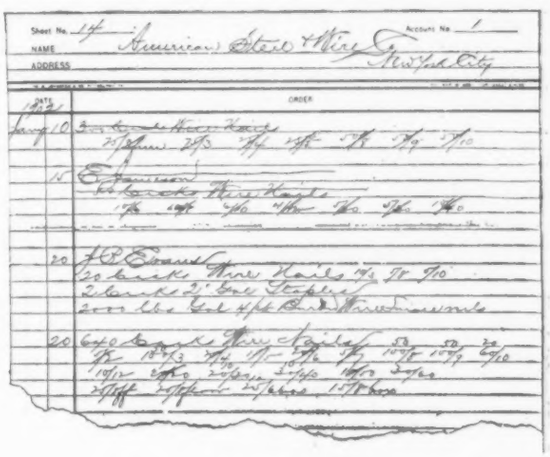
	Discount.
From store	88 and 5 %
F.o.b. factory carload lots	89 and 5 %

Oils.—*Linseed Oil.*—The reduction in the price of Linseed Oil has not influenced large buyers to come into the market, while, on the other hand, lack of demand and anxiety on the part of some to sell has resulted in lower quotations for out of town brands. Small lots of Oil are moving fairly well. Quotations are as follows: City Raw, in lots of five barrels or more, 60 cents; in lots of less than five barrels, 61 cents per gallon; out of town Raw, 58 to 60 cents per gallon, according to quantity.

Spirits Turpentine.—There has been some activity in the Turpentine market during the week as a result of a stronger feeling in the South and a reduction of supplies in the hands of large local consumers. Prices have advanced ¼ cent per gallon as follows, according to quantity: Southerns, 47¼ to 47¾ cents; machine made barrels, 47¾ to 48¼ cents per gallon.

KEEPING TRACK OF UNFILLED ORDERS.

A PROMINENT wholesale house in one of the Eastern States is using the following system of keeping track of unfilled orders from manufacturers. All orders sent are copied into a large, loose leaf indexed holder. One of these sheets, reduced in size, is shown in part in the accompanying cut, illustrating how orders are crossed off with red ink when they are filled or partially filled. The orders without names attached represent direct shipments for stock, while special orders for factory delivery direct to customers have their names entered in red ink. The first order shown in the cut is for stock, and all the Nails having been received the order is crossed off. The second order, given on January 15, was for shipment direct to E. Jameson, and the Nails having been delivered the name and all the



Keeping Track of Unfilled Orders.

items are crossed off. The third order for Nails, Wire and Staples to be shipped direct to J. B. Evans has not been filled, and therefore nothing is crossed off. The fourth order, given on the same date, is for stock, and the sheet shows that it has been partly filled. Each invoice as it comes in the office is checked, and part or all of the goods, as the case may be, are crossed off the sheets. The indexed holder containing the order sheets is in the possession of the shipping clerk for constant reference. By this system an account never changes its position in the holder, and as the leaves accumulate and all orders are crossed off as filled they are periodically transferred to a binder. In this way reference can be made to previous orders that have been filled, while only the more recent orders are kept in the holder.

THE AMERICAN CUTLERY COMPANY.

THE AMERICAN CUTLERY COMPANY, 193 Mather street, Chicago, have decided to construct additions to the present factory, which they claim will make it the largest establishment of its kind in the world. Contracts have been awarded to R. & S. Sollitt Company for a new six-story, mill constructed factory and warehouse, which will occupy 480 feet on Mather street. The feature of the facade will be the central tower, which will contain the office rooms. The company propose to install in their new home electrical machines, electrical elevators, electrical carriers to facilitate the movement of work from one department to another, and a new 800 horse-power Corliss engine.

S. A. Foote & Son have succeeded S. A. Foote in the Hardware, Stove, Agricultural Implement, Wind Mill, plumbing and furniture business in Parkersburg, Iowa. The new firm have remodeled their furniture department, and have made additions to their entire stock.

THE STEEL GOODS CONSOLIDATION.

THE consolidation of Steel Goods manufacturers, to be known as the American Fork & Hoe Company, will include 80 per cent. or more of the productive capacity in their branch of industry. Attorneys M. B. and H. H. Johnson of Cleveland, who represent the promoters, are quoted by the Cleveland *Leader* as having made the following statement:

The company are organized on an exceptionally conservative basis, and of their assets $500,000 or more is in cash. The company do their own financing and there will be no offer of their stock to the public. The matter has been under advisement by the different manufacturers for the past year. The rapid advance in the price of steel, which enters largely into the product, as well as the large advance in Handles, has made it seem necessary to the manufacturers that in order to maintain prices at their present level without materially advancing them, it would be necessary to largely curtail expenses of management, which is believed can be done better under a single rather than a diversified ownership. It is the intention of those largely interested as stockholders to maintain, so far as possible, a price on the goods which shall pay, under economical management, a fair return on the invested capital and at the same time protect the interests of the farmer in the matter of price against an advance. It is generally conceded and believed that the foreign business, under single ownership, can be largely increased. The management of the company will be in charge of men who for years have been identified with and built up the business. The company will start with ample manufacturing facilities, having eleven fully equipped factories and ample capital. The headquarters or general offices of the company will undoubtedly be located in Cleveland.

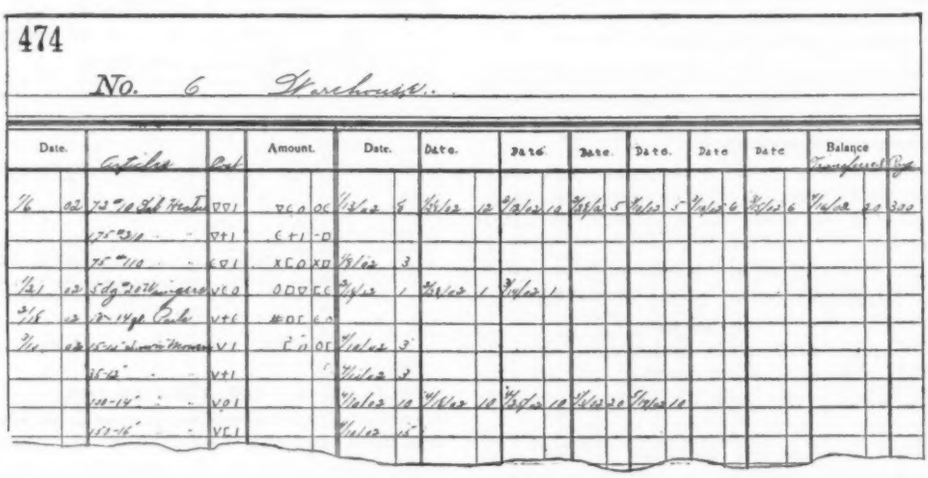
FINE CUTLERY AND CASES.

GRAEF & SCHMIDT, 107 Chambers street, New York, sole agents in the United States and Canada for J. A. Henckels, Solingen, Germany, have just put on the market a series of Art Pocket Knives for both gentlemen and ladies. All of the handles are enameled in a variety of handsome colors on both sides. In one group the handles are enameled in a lily of the valley design in a total of four colors. This Knife is for ladies' use, is 2½ inches long when closed, has three blades and a nail file and is very thin, being only about 3-16 inch thick, the blades opening on both back and front, two on a side. They are neatly put up in boxes containing four Knives, one of each decoration for an assortment and each in a fine chamois case. Another Knife, somewhat similar in character, is medium sized, having three blades and nail file the same as the Knife described above, but is 2¾ inches long and suitable for either sex. This knife has a well executed sunflower design and is put up in the same way. The third group is a gentleman's Knife 3 inches long when closed, having a large and small blade on one side with a long manicure nail file on the back. The ornamentation in this case is an antique design in four colors of enamel and each Knife has some distinctive characteristic as to the combination of color.

There are also among the newest goods several assortments of elegant Scissors, each case containing three, four or five Scissors, according to the requirements of the buyer. One example is an Art Nouveau design in fine calfskin cases beautifully wrought pyrographically. Another style of case filled with Scissors having gold plated handles is covered with handsomely marked lizard skin and lined with white satin. Still another style of case is one covered with alligator skin. It is colored a delicate tint of light purple. The case is lined with lavender satin and the Scissor handles are gold plated.

ACCOUNT OF GOODS IN WAREHOUSE.

THE accompanying cut shows a portion of a page, reduced in size, of a warehouse book in use by Frank F. Bael of Trenton, N. J. The design of the book is to keep track of stock temporarily in warehouses and to avoid running out of goods. As will be seen by the illustration the first column shows the date goods were delivered at warehouse No. 6, followed by the name of the articles, cost and total amount figured in a special cost mark. Then come seven date columns where successive dates are entered, and the amount of goods that were drawn out on each date. The last column refers to the balance still on hand, the date it was transferred and the number of the page to which it was transferred.


474

No. 6 Warehouse.

Date.	Articles	Cost	Amount.	Date.	Date.	Date.	Date.	Date.	Date.	Date.	Balance Transferred Pg.
1/6 02	75 "10 Tab Hooks	V01	7 60	1/3/02 6	1/6/02 12	2/3/02 12	2/15/02 5	3/6/02 5	3/15/02 6	3/16/02 6	4/1/02 40 300
	75 "8 "	V11	6 40								
	75 "10 "	X01	X 60	1/3/02 3							
1/21 02	Sdg 20th wagon	V10	000 60	2/3/02 1	2/6/02 1	2/16/02 1					
2/15 02	12 1½ pr Cable	V16	4 80								
3/6 02	12 Cultivator Wheels	V1	2 40	3/6/02 3							
	12 "	V11		3/6/02 3							
	100-16"	V01		3/6/02 10	3/6/02 10	3/15/02 10	3/16/02 20	3/18/02 10			
	100-16"	V01		3/6/02 15							

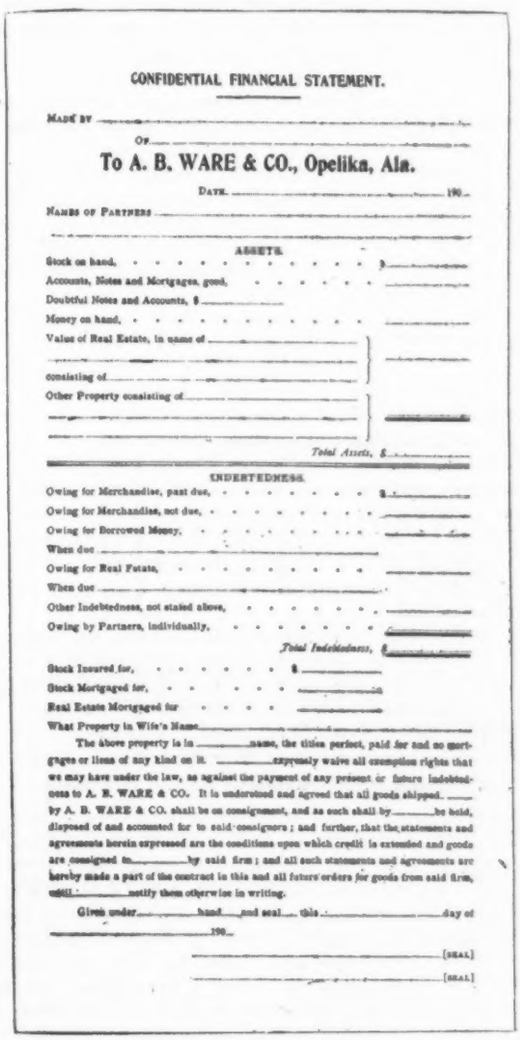
Warehouse Entry Book.

WILHELMI & Co., 116 Broad street, New York, refer to a few of the many markets to which they ship goods, they having branch houses in many of the more important countries. Shipments to Australia have been curtailed largely by a variety of causes, chief among which are the drought and tariff agitation. Bombay, India, is drawing on this country for a supply of raw cotton on account of the crop failure there. The concern have already executed orders for 5000 bales of this staple. That market is also cabling for Galvanized Iron Pipe, Wire Nails, and is also taking Bicycles in appreciable quantities. The statement concerning Bicycles is equally applicable to Japan. India, China and Japan are taking large quantities of Kerosene Oil Lamps. The Philippines are taking quantities of cotton duck for sails, &c., as well as cotton prints, calicoes, &c., the firm having their own branches in all the markets referred to.

Jennings Hardware Company's store at Moran, Kan., was destroyed by fire a short time since. The loss was about $4000, with insurance of $2000.

A COLLECTION WINNER.

THE confidential financial statement, of which a reduced reproduction is given herewith, is referred to by A. B. Ware & Co. of Opelika, Ala., as a good collection winner for them. They have their customers fill out the blanks during the months of January and February, and if their statements are satisfactory the firm open 30 and 60 day accounts with them. If an account cannot be collected under the waive note clause, which is in the statement, they use the consignment clause. This clause is referred to as also being a great advantage in case of bankruptcy and consignments, as the line of goods they sell are not perishable, and the firm



CONFIDENTIAL FINANCIAL STATEMENT.

MADE BY .....

OF .....

To A. B. WARE & CO., Opelika, Ala.

DATE. ..... 190..

NAMES OF PARTNERS .....

ASSETS.

Stock on hand, ... $.....

Accounts, Notes and Mortgages, good, ...

Doubtful Notes and Accounts, $.....

Money on hand, ...

Value of Real Estate, in name of .....

consisting of .....

Other Property consisting of .....

Total Assets, $.....

INDEBTEDNESS.

Owing for Merchandise, past due, ... $.....

Owing for Merchandise, not due, ...

Owing for Borrowed Money, ...

When due .....

Owing for Real Estate, ...

When due .....

Other Indebtedness, not stated above, ...

Owing by Partners, individually, ...

Total Indebtedness, $.....

Stock Insured for, ... $.....

Stock Mortgaged for, ...

Real Estate Mortgaged for . . . .

What Property in Wife's Name .....

The above property is in .....name, the titles perfect, paid for and no mortgages or liens of any kind on it. .....expressly waive all exemption rights that we may have under the law, as against the payment of any present or future indebtedness to A. B. WARE & CO. It is understood and agreed that all goods shipped..... by A. B. WARE & CO. shall be on consignment, and as such shall by.....be held, disposed of and accounted for to said consignors; and further, that the statements and agreements herein expressed are the conditions upon which credit is extended and goods are consigned to.....by said firm; and all such statements and agreements are hereby made a part of the contract in this and all future orders for goods from said firm, until.....notify them otherwise in writing.

Given under.....hand.....and seal.....this .....day of .....190..

.....[SEAL]

.....[SEAL]

Confidential Financial Statement.

always prefer paying the return freight on goods rather than lose them. They state that out of a business in 1901 of $96,000, their loss did not exceed $250.

One form of postal card used by the firm, sent to customers to announce the coming of their traveling men, is a picture of the salesman on the upper portion of the card. Under the picture is the following:

TAKE NOTICE.

The above, our trusted traveling salesman, fled from this city. We think it probable that he will be in your place in five days. Arrest him if necessary, but anyway hold him until you have examined his baggage, which contains sample Hardware and Crockery which he took with him.

A. B. Ware & Co., Opelika, Alabama.

Sapp Hardware Company are successors to A. W. Lee in the Hardware, Sporting Goods, Steam Fittings and Mill Supply business in Cairo, Ga.

THE CARE OF PRICES, QUOTATIONS AND CATALOGUES.

THE accompanying cut relates to a system devised and in use by the J. A. Harps Mfg. Company of Greenfield, Ohio, for the care of prices, quotations and catalogues. In a book, the pages of which are indexed to suit the requirements, are entered the names of the materials which the company are using.

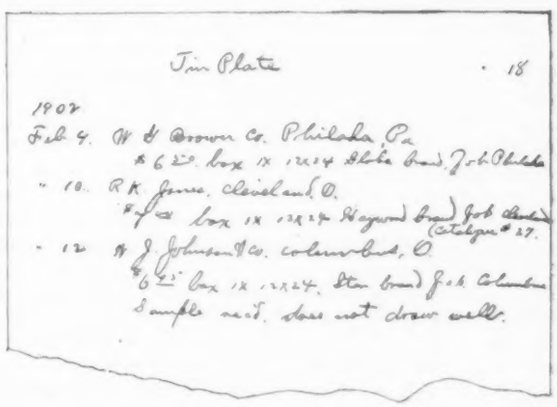
Arrangement of the Book.

Thus on page indexed "Q R S T" are entered Tin Plate, Solder, Springs, &c. After Tin Plate is written "p. 18." Then on page 18 is entered the heading, "Tin Plate."

On February 9 a quotation was received from W. G. Brown, Philadelphia, Pa., which is entered as indicated.

On February 10 a quotation came from R. K. Jones, Cleveland, Ohio, also catalogue. This is entered as shown, and the catalogue is numbered 27.

On February 12 the company were in receipt of a



Tin Plate . 18

1902

Feb 9. W. G. Brown Co. Philada. Pa
" 10. R. K. Jones, Cleveland O.
" 12 " J. Johnson & Co. Columbus, O.
Sample not. does not draw well.

quotation from W. J. Johnson & Co., Columbus, Ohio, with a sample which is unsatisfactory. This is entered as shown.

Using the System.

When it is desired to compare quotations on Tin Plate the company turn to "T" in the index. After "Tin Plate" is seen "p. 18." Turning to page 18 are the names of all parties quoting Tin Plate, their prices, date of quotation, terms, particulars, catalogues, &c., at a glance. The late quotations, of course, come last on the page. No notation is necessary, as everything is given on the one page.

Some Advantages.

Among the advantages which the company have found in the system are the following:

The original letter giving the quotation is kept in a letter file, and can readily be found, as the book gives the date of the quotation. If the name of a party is forgotten, it can readily be found by this system. Most business men occasionally recall low quotations, but forget the company making them. By glancing over the pages of the book a person can tell how prices have been ranging for several years back, and by this means may anticipate the future better.

Peru Van Zandt Implement Company have succeeded the Van Zandt Implement & Hardware Company, Wichita, Kan. The company handle Farm Implements, Buggies, &c., but no Hardware. They have just finished a fine modern building, which is 62½ x 120 feet, four stories.

Says an experienced dealer: "I do not believe there is a man living who has not, at some time or other, bought goods which he would not have purchased unless influenced by the displays seen in windows. This has been everybody's experience and shows in a sufficiently clear light the importance of timely and tasteful arrangements."

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, Hastings House, Norfolk St., London, W. C.

The Week's Hardware Trade.

THE most interesting item of information this week is, paradoxically enough, rather stale news. It is confirmed that 60,000 Enameled Street Labels have been ordered in Birmingham for delivery in New York. The firm obtaining the order are the Imperial Enamel Company of Birmingham. It is stated that the importance attaching to the contract is that attempts have been made previously by English firms to obtain a footing in the United States, but without success. It is further stated that the Imperial Enamel Company have opened a branch office in New York. It will be within the recollection of your readers that I have several times, in my weekly market comments, referred to the activity of the Enameled Sign manufacturers. I have gone further and expressed surprise that Americans have not entered into this trade more keenly. This order is a striking exemplification of my numerous comments on this point.

The trade generally continues stagnant, or next door to it. Orders that come in, while in fair numbers, are small and obviously intended to tide over present requirements. In the special lines, Saws just now are selling exceptionally well, a large number going to South Africa. The home market business is, if anything, below the average. Brass founders state that trade has not been so stagnant for many years. In the early part of the year they had a fairly brisk time, but about a month ago, before the coronation, the brass foundry trade drooped and has not since held up its head. The Wolverhampton Hardware trade continues more active than that in Birmingham, although it is difficult to account for the reason. Galvanized Iron Roofing is selling in large quantities, as also are Iron Hurdles and Tubes for water and gas. The Edged Tool makers in the neighborhood of Wolverhampton are also busy, particularly on export account; but on the home account Edged Tools for Implements are in good request. There is also a marked improvement, both in Birmingham and Wolverhampton, in the builders' ironmongery department. In Light and Stamped Hollow Ware there is also activity slightly beyond the average.

On overseas account the South American markets disappoint expectation, although there has been some slight improvement in the case of the Argentine Republic, doubtless due to the opening of British ports to Argentine cattle. On the other hand, orders from Chile, Brazil and Uruguay continue distinctly slack. Reports are more favorable from Canada, America and Mexico, particularly for tools and iron. Canada is buying quite a number of Metallic Bedsteads, while from America orders have been received during the week for Angles, Vises, Saddlers' Ironmongery and certain kinds of tools. The drought is having an adverse influence upon orders, both from India and Australia. In the Cutlery branches orders are very unevenly distributed. There is a good demand for Spring Knives, and as luck would have it, it is just in this very line where there is a distinct shortage of skilled labor. A branch which has sprung into great activity since the close of the war is the manufacture of cheap strong Clasp Knives for the South African native trade. They are known in Sheffield as the "Kaffir" Knives. Orders for these are in sufficient quantity to keep the factories going for some weeks.

We can now see our way to a successful harvest which cannot fail to have a good influence upon the Agricultural Implement trade. Last year the harvest was disappointing, with the result that firms making Malleable Castings for Agricultural Implements had a dull time of it. Recently, however, business has improved, as the farmers now buy readily, being assured that the harvest is better than for many years past.

With reference to remarks on the possibility of improved trade with the Argentine in the autumn, I would draw attention of American exporters to the successful attempt in this country to establish a Latin-American Chamber of Commerce in London. This organization is intended to represent British interests in South and Central America, and a significant evidence of the sympathy of South and Central America with the idea is shown by the fact that the official representatives of Argentina, Bolivia, Colombia, Guatemala and Venezuela have already associated themselves with the venture. In addition, the support of the principal South and Central American railway companies, as well as the chief private trading firms, has been secured. The combination is a strong one and should be watched.

A sharp decline occurred in the July exports of Tin Plates and Sheets to America, the tonnage falling from 8608 tons in July, 1901, to 3405 tons last month, the values being £108,642, as against £49,117. It is interesting to note further, however, that notwithstanding this marked decline of exports to America, the export Tin Plate trade more than maintained itself. On the seven months Tin Plate exports there is a large increase of trade as between South Wales and America.

The secretary of the Sheffield Chamber of Commerce has received notice that sealed tenders, marked "Telegrafog-Telefonmateriel," will be received at the Board of Managers' Office, Christiania, up to 3 p.m. on the 13th proximo, for the supply to the Norwegian State Railways of the under mentioned goods:

22,000 kilos of Telegraph Wire, No. 8 Galvanized Iron Wire, 4.1 to 4.3 mm. in diameter.

5400 kilos of Telegraph Wire, No. 11 Galvanized Iron Wire, 4.1 to 4.3 mm. in diameter.

3600 kilos of Copper Wire, 2.4 to 2.6 mm. in diameter.

5900 kilos of Porcelain Insulators.

5900 kilos of Insulator Holders.

Tenders may include part or all of the goods required. Further particulars can be obtained on application to the office of the Inspector of Telegraphs, Storer's Gade, Christiania. Apart from the usual customs duties a preference of from 10 to 15 per cent. is given to native manufacturers.

Among orders received during the past week was a large one for Galvanized Corrugated Sheets at £18 5s., delivered at Auckland or New Zealand. The Australian and New Zealand mails have brought orders since the opening of this year for Corrugated Sheets equal in value to £644,000, or an increase of 29 per cent. on last year.

American Sand-Blasted Files in Scotland.

A subscriber to the *Ironmonger* writes to that journal in the issue of August 2 to the effect that American Files are undoubtedly gaining ground in this country, and more particularly in Scotland, and he suggests as an explanation that the American makers give a guarantee that all their goods are sand blasted. It has always been understood that American Files are bought in Britain not because they are better liked than the home made article, but because they are cheaper, as the Americans "dump down" their surplus production of Files in this country and dispose of it at below cost Belief in this explanation has undoubtedly created a feeling of helplessness in the minds of many British makers who otherwise would have felt disposed to combat the competition from across the Atlantic. The *Ironmonger* correspondent, however, declares that he knows of instances in which American Files are actually preferred to British on their merits, and where more money is being paid for them simply because they are sand blasted. The editor adds that few Sheffield firms possess a sand blasting apparatus, and it is the custom of the trade only to sand blast Files at the request of the purchaser, who on such parcels has to forego 2½ per cent. of the discount. There is, however, one sand blasting establishment where work is done for the trade. Most Sheffield File makers do not approve of the process, which, they say, shortens the life of the teeth, although giving them a sharper point; but it is a significant fact that in all Government contracts sand blasted Files are specified. The universal adoption of the treatment in the United States suggests that the Sheffield view may be due partly to habit or prejudice. From my own personal knowledge I can say that American Files are selling more freely in this country every year. The trade

has only to be cultivated a little more assiduously. There can be but little doubt that some of the American machinery excels any to be found in this country. The point I most welcome in the foregoing remarks is that American Files are being preferred on account of quality rather than price. There is still a strong prejudice among workmen on this side for a File that will last a considerable length of time. Even yet many workmen return their Files to be recut. American Files of inferior quality have undoubtedly come into the British market, and while they have sold readily to begin with, they have in the long run done considerable harm to American File making interests.

British Purchases from America.

Considerable comment has been made throughout the whole English press upon the large drop in American exports as shown by the Washington returns. There is even a disposition to believe that English manufacturers have at length taken the measure of their American competitors. American agents over here, however, are not in the least concerned about these figures. They tell me that since Americans are ready to make prompt deliveries, they are quite in a position to sell in greatly increased quantities. I have spent a couple of days this week moving among American buyers, and they all agree that what is wanted is prompt delivery. The loyalty of these gentlemen always stirs my admiration. They generally say, "Personally I can get all I want, but I happen to know that So-and-So or So-and-So has failed to secure his deliveries." That England is still buying Hardware and allied goods from America admits of no doubt. I have, however, extracted a few particulars of American shipments to this country for seven days in the early part of the current month. The result is interesting and works out as follows:

English Hardware Imports from America for One Week

LONDON.

"Minnetonka," from New York.
2 Automobiles.
180 cks Copper Ingots.
34 pkgs Clocks.
26 pkgs Motors and parts.
24 pcs Drill Steel.
110 cs Bar Steel.
24 pkgs Electrical Goods.
85 crts Refrigerators.
9 cs Locomobiles.
100 bbls Skewers.
25 pkgs Files.
621 pkgs Radiators.
1369 plates Spelter.
21 cs Cash Registers.
31 crates Wheels.
4 cs Electric Motors.
227 pkgs Implements.
826 pkgs Machinery.
517 pkgs Hard Wood and Metal Ware.

HULL.

"Martello," from New York.
6 bbls Wire.
25 crts Cycles.
11 ingots Brass.
49 pkgs Apparatus.
315 pkgs Hardware.
9 cs Instruments.
142 bdls Manufactures.
6 bdls Castings.
146 pkgs Agricultural Implements.
14 pkgs Pumps.
13 cs Forgings.
159 pkgs Handles.
223 pkgs Iron Pipes.
334 Spikes.
104 pkgs Machinery.

LIVERPOOL.

"Umbria," from New York.
58 pkgs Hardware.
3 cs Sewing Machines.
31 pkgs Machinery.
378 bars Silver.
86 pkgs Agricultural Implements.
38 cs Slot Machines.
17 bbls Castings.
7 pkgs Wood Pulleys.
8 pkgs Mowers, &c.
10 kgs Sausage Casings.
52 pkgs Handles.
200 crts Oil Stoves.
180 crts Ovens.
50 cs Rake parts.
100 bdls Mills.
200 Rake Wheels.
21 cs Forgings.
56 pkgs Steam Pipe Castings.
36 bdls Wagon Material.
17 pkgs Windmills.

"Bovic," from New York.
16 crates Pails.
6300 hd Staves.
1 bx containing Automobile.
92 pkgs Machinery.
10 bxs Car Trucks.
16 Car Wheels.
12 bxs Car Trucks.
40 bxs Wood Door Handles.
873 bdls Hard Wood Floorings.
10,895 pigs Lead.
14 cs I. P. Fittings.
11 cs Steel.
1672 bars Copper.
10 pcs 10 cs Trolley Poles.
32 cs Tinware.
5 cs 87 bbls Lamps.

"Merion," from Boston.
87 cs Machinery.
21 pkgs Agricultural Machinery.
56 bxs Sewing Machines.
22 pkgs Shoe Machinery.
24 bxs Nails.
9 cs Furniture.
1 Engine, 5 Trucks.
8 bdls Drills.
34 pkgs Wire.

BRISTOL.

"Wells City," from New York.
10 cs Handles.
38 bbls Skewers.
22 cs Machinery.
1462 bgs Nails.
68 bbls Wire.
8 crates Wheels.
51 cs Laths.
1 car Slates.
38 cs Hardware.
42 cs Furniture.

MANCHESTER.

"Camoens," from New York.
771,550 lb Washed Metal.
166 bxs Car Steel.
30 bxs Plated Ware.
26 cs Woodenware.
252 cs Lanterns.
5191 bars Copper.
13,459 pigs Lead.
276 pcs Castings.
254 reels Copper Wire.
2885 pcs Iron Pipe.
498 pkgs Machinery.
1 part Boring Machine.
29 pkgs Electrical Material.
15 pkgs Copper.

LONDON.

"Maryland," from Philadelphia.
101 crates Wheels.
4 crs Roofing Slates.
44 cks Zinc Dross.

LIVERPOOL.

"Majestic," from New York.
22 pkgs Lamp Goods.
258 pkgs Hardware.
343 pkgs Machinery.
347 bars Silver.
14 cs Wrenches.
154 pkgs Clocks.
43 pkgs Clocks.
1780 pcs Rollers.
116 bxs Sewing Machines.
255 cks Crude Metal.
17 pkgs Hardware.
228 pkgs Machinery.
38 pkgs Electrical Supplies.

BRISTOL.

"Brooklyn City," from New York.
40 bbls Wire.
105 pkgs Castings.
266 pkgs Handles.
3 cs Wire.
10 cs Spokes, Hubs and Handles.

LONDON.

"East Point," from Philadelphia.
96 crts Wheels.
40 pkgs Iron Washstands.
40 pkgs Wire.
186 pkgs Wire.
505 bgs Wire Nails.
15 cs Machinery.
26 cs Tool Boxes.
2 cs Hardware.
301 sks Handles.
63 bxs Steel Bars.

"Minnehaha," from New York.
290 bxs Radiators.
30 pkgs Machinery.
51 Castings.
6 cks Locomobiles.
13 pkgs Motors.
256 pkgs Ovens.
610 bxs Sewing Machines.
15 pkgs Cycles.
13 pkgs Clocks.
91 cs Cash Registers.
4 cars Bar Steel.
89 pkgs Wheels, Spokes, &c.
19 pkgs Valves.
68 pkgs Electrical Goods.
17 reels Electrical Cable.
12 reels Copper Wire.
322 pkgs Machinery.
931 pkgs Hard Wood and Metal Ware.
42 pkgs Clocks.
15 pkgs Refrigerators, 3 pkgs Automobiles and 250 pkgs Horseshoes.

LIVERPOOL.

"New England," from Boston.
839 pkgs Machinery.
7 pkgs Emery Wheels.
10 cs Shoe Machinery Wire.
8 bbls Old Metal.
26 bxs I. Nails.

"Turcoman," from Portland, Maine.
72 pkgs Agricultural Implements.

"Rhyniand," from Philadelphia.
231 pkgs Handles.
20 bxs Bolts.
9 bxs Type.

LONDON.

"Crown Point," from Philadelphia.
51 pkgs Tool Boxes.
79 bbls. Wire.
54 bbls. Zinc Dross.
2 Cable Lifters.

LIVERPOOL.

"Lucania," from New York.
19 cs Electrical Goods.
40 pkgs Hardware.
30 pkgs Machinery.
797 bars Silver.
13 cs Slot Machine Fittings.
10 bbls Iron Staples.

"Irada," from Baltimore.
18 crts Handles.
3184 Ingots.
4400 bars Copper.
2243 pkgs Wire Nails.
230 bdls Plain Wire.
27 crates Wheels.

"Devonian," from Boston.
23 bxs Nails.
273 slabs Zinc Dross.
8 bbls Wire.

"Cevic," from New York.
46 pkgs Machinery.
17 pigs 3 bbls Zinc Dross.
8 Electric Motor Trucks.
2 bxs parts.
84 bxs 7 cs Lamp Goods.
10 cs Spokes.
513 coils Copper Rods.
22 cs Valves.
1135 kgs Nails.
10 cs Axes.
445 pkgs Tills.
6 cs Iron Valves.

MANCHESTER.

"Bellaura," from New York.
729,600 lb Washed Metal.
100 bxs Zinc Oxide.
795 bdls 363 pcs Iron Pipe.
20 pcs, 222 cs, 36 pkgs, 161 bxs Machinery.
300 bgs Wire Nails.

American Sewing Machines in Great Britain.

A sympathetic attempt is now being made by American agents to push American Sewing Machines through Hardware channels. This is notably the case in the representative of the National Sewing Machine Company—the South British Trading Company of Victoria avenue, Bishopsgate Street Without, London, E. C. Although the difficulties are not to be blinked at in thus changing the current of trade, yet there is no reason why it should not, in the long run, prove to be entirely successful. Sewing Machines in Great Britain are sold at present mainly through special agents, who themselves canvass from house to house. The South British Trading Company are now trying to push, as I say, Machines through retail Hardwaremen, although, of course, orders for these Machines will be filled through the factors. Among the lines most relied upon are the Eldredge Automatic Silent Sewing Machine, the Vindex and the Expert. In an advertisement issued by this company I extract the following sentences:

> The ironmonger is well qualified to sell Sewing Machines in his locality. Technical knowledge is no longer necessary; he merely requires a Sewing Machine fully warranted for five years, simple in construction, requiring no repairs, quality and workmanship the best that brains, modern plant and money can produce; originality and style in finish of woodwork, and after this a line with a margin of profit that puts ordinary staples entirely out of consideration. We have an interesting proposal for live ironmongers which may be had for the asking; your factors will tell you about it, or write us, and we will send you full particulars.

Belgian Gun Competition.

Midland Gun manufacturers are very much concerned with the increasing competition of cheap Belgian Guns. Some time ago I announced that the operative Gun makers of Birmingham were sending a deputation to Liège to study the working of the Gun trade technical school in that town. There has recently been a technical school established in Birmingham, but it would appear that

the hours militate against its success. A gentleman writing on this point states: "As was anticipated, the attendance has fallen off, owing no doubt to the disinclination of youths to start work again after the fatigue of their ordinary day's labor I would therefore suggest that the classes should be so arranged that the time spent at them should practically come out of the ordinary day's working time, and I would appeal to masters to allow students to leave work, say at 4 p.m., so as to arrive at their classes at 5 o'clock and work until 8." This gentleman, Arthur Bonehill, has inspected the Liège school, and states that a day school has been established. It opens at 8 a.m. and continues till 4 p.m. in the summer and commences half an hour later in the winter. Each lad receives remuneration equal to 2½ pence per day. In Birmingham the school is only carried on in the evening from 7 to 9.30, and Arthur Bonehill is not surprised that the attendance of youths should be so small, as they do not leave work until 6 o'clock, and in many cases have insufficient time to go home, get their meal and return to the school, while the strain after a full day's labor is altogether too great. He points out that it is absurd to expect that a school of a dozen or two lads can supply sufficient skilled workmen for the requirements of the Gun trade. In Belgium the cost of the school is defrayed jointly by the gunmakers, the Proof House and the State, and he urges that some similar arrangement should be made in this country, if the English Gun trade is to maintain its position.

Increased American Trade with New Zealand.

Week by week I report upon good orders coming from New Zealand to Hardware and Cutlery manufacturers in this country. It always seems as if New Zealand is our great standby when other countries fail us. Nor can there be any doubt that New Zealanders take a special pleasure in buying from the old country. Notwithstanding this, however, they are buying in greatly increased quantities from America. I have extracted the following particulars of American goods imported into New Zealand from America in the years 1901 and 1898. At a glance it will be seen what a large increase in American trade has been secured:

Imports from the United States into New Zealand in 1901 *and* 1898.

	1901.	1898.
Arms, Caps, Cartridges and Cases	£14,408	£6,201
Bicycles and materials	22,205	29,578
Brushes and Hardware	3,162	1,620
Cordage	1,981	1,248
Hardware	42,146	25,116
Iron: Wire, Barbed and Plain	30,217	33,634
Pipes and Fittings	20,096	6,888
Pig	2,145	5,065
Rails	23,722	4,467
Bar, Bolts and Rod	17,842	37
Bolts and Nuts	3,019	1,110
Sheet and Plate	4,216	....
Sheet Galvanized Corr	3,523	....
Other shapes	3,039	1,714
Lamps, Lanterns and Wicks	6,310	5,992
Machinery: Agricultural	44,838	33,565
Dairying	4,834	3,135
Dredging	11,512	....
Electric	3,089	801
Gas Engines	7,347	4,878
Gas making	10,350	6
Mining	12,066	10,746
Sewing and Knitting	22,865	14,142
Printing	8,816	2,924
Refrigerating	1,737	6,348
Plows and Harrows	4,574	2,871
Wood working	6,171	2,164
Other	13,265	3,980
Materials and parts	2,080	348
Metal manufactures	5,837	2,354
Typewriters	3,198	1,814
Nails	14,505	8,022
Tools and Implements	52,669	43,842
Woodenware	15,693	14,154

Freight Rates to South Africa

It is said that the British trade commissioners now in South Africa, in sending in their final report upon the relative positions of British, American and German enterprise in Cape Colony, will speak very strongly upon the high freight rates charged upon British goods as compared with those demanded from German and American rivals. They will declare that on freight alone the British manufacturer pays from 6 to 10 shillings more per ton on the journey from London to the Cape than the American manufacturer has to pay for the journey from New York, the grievance, of course, being all the greater as the distance from New York is greater. There can be no doubt that there is an immense amount of suppressed indignation at the freight rates as from Great Britain to South Africa, and this feeling only requires to be organized to express itself to the shipowners in very forcible terms.

Hardware and Cutlery for India.

I have so often commented upon the prospects of India as a future market for Americans that I am now glad to give the actual particulars of Indian purchases of Hardware and Cutlery during the past three years:

	1899-1900. *Rupees.	1900-01. Rupees.	1901-02. Rupees.
Cutlery	971,700	964,948	1,211,227
Agricultural Implements	722,156	837,520	697,286
Other Implements	1,188,273	1,177,439	941,765
Sewing Machines	553,888	619,725	591,046
Unspecified Hardware	12,466,904	14,815,107	13,625,051
Totals	15,902,921	18,414,739	17,066,375

* 1 rupee equals 48 cents.

It may be remarked that after the large trade done in the year 1900-1901 there was a setback, but this was due rather to lower prices than to smaller trade, except in the case of Agricultural Implements, the depression in the tea industry accounting for this. Europe supplies 26 per cent. of Indian imports of Agricultural Implements, and the proportion of British goods sent to India on the whole is gradually falling. The Germans continue to push Hardware and Cutlery, and very cheap lines are made on the Continent, particularly in Austria, for export to Asiatic and African markets, who find an easy outlet for their purchases in the Indian bazaars. Last year there was a greatly increased demand for iron and steel. Judging by the figures it would seem as if the effects from the recent Indian trade depression have now practically been dissipated. The following figures will show the trend of the market:

	Iron. Tons.	Steel. Tons.
1897-98	196,895	92,355
1898-99	164,517	84,145
1899-1900	149,097	72,636
1900-01	166,991	92,586
1901-02	180,642	158,916

TRADE ITEMS.

THE statement that the large new plant under erection for more than a year by the American Axe & Tool Company, at Glassport, Pa., had been finished is incorrect. A portion of the new plant is completed and the balance will be finished in a short time. This will be the largest single works owned by the American Axe & Tool Company, and the equipment will be modern and complete in every detail.

FRANK H. THOMPSON, export manager of the Stanley Rule & Level Company, New Britain, Conn., and 107 Chambers street, New York, has just returned from an extended trip through the commercially important countries of Europe. This company have for years been manufacturing fine Mechanics' Tools in great variety and volume, many of which have found their way to these and other foreign markets, but no direct representative of the company has been in the habit of calling on that trade. Mr. Thompson's business was to visit the countries referred to and familiarize himself with their methods of business. This trip, occupying between three and four months, was the first one abroad for him. One thing that favorably impressed him was the treatment accorded the American traveler in Continental Europe. So far as methods of transportation and baggage handling are concerned America is unquestionably ahead, but to a stranger, unaccustomed to so many countries and languages, his experience was that every assistance was afforded him by railroad officials and others for getting about comfortably as far as their facilities permit.

Letters From the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Buying from a Number of Houses.

From time to time a correspondent here and there has touched on the desirability of concentrating orders on one traveler or one house, and in the discussion of the subject of special brands *vs.* factory brands in recent issues reference has incidentally been made on two or three occasions to the policy of our correspondents in this regard. The following letter from a merchant in Nebraska has been called out by these expressions. It will be observed that the writer points out the advantage to the town when its different merchants divide their business with a goodly number of traveling men, instead of giving most, if not all, to a favored few:

I have been much interested in the various discussions given place in your columns, and while I would not wish to have you publish this letter there is one point that the average retailer overlooks. It is this turning down all but the favored drummer or house. One house could easily supply my needs, but I buy from three. If one man comes he leaves money for one meal, one driver, one hack fare, &c. Three men leave three times as much. A town that enjoys a good transient trade at the hotel and livery gets that much more cash from these respective lines right at home.

Take a village of ten stores and let them watch these things and they can see a marked improvement in this one line, and I believe if some of these points were brought to your readers' notice it would be beneficial to all, as the man who now gets all these in one town would have to divide up. On the other hand he would get a slice of some other man's "cinch."

To illustrate my point. I sold a Range to a woman. She was keeping a hotel and complained that trade was dull and she could not meet her payments. I told her I would help her all I could. So to men who would have given our town the go-by on their next trip if turned down I gave small orders—enough to justify their getting off at our town. By keeping this up this woman noticed an increase in her patronage and the thought occurred to me if all our retailers would pursue this policy how quickly she could pay her bills.

Trade in the Northwest.

A correspondent sends us the following advices in regard to business in the Northwest, which is evidently of a very satisfactory character:

Business in the Northwest is in an exceedingly prosperous condition—good crops with fair prices—fine cattle and big prices for beef and wool, and even the copper mining is not in as bad a state as many Wall Street folks seem to want the public to believe. There is much new building being done in Minnesota and the Dakotas, and no small amount in the towns of Montana.

All this is, of course, making good trade, and in my line there seems to be an increasing demand.

IN MEMORY OF HENRY KNIGHT.

A MEETING of the Hardware Merchants' and Manufacturers' Association was held in their rooms in the Bourse Building, Philadelphia, on August 20. Thomas Devlin was elected chairman and J. H. Newkirk secretary. The following resolutions were passed and ordered placed on the records of the association, and a copy sent to the family of the late Henry Knight, whose death was announced in our last issue:

Whereas, Divine Wisdom has called from this world's activities our associate, Henry Knight, who now rests from his labors; and

Whereas, A companionship extending back some 50 years has been broken to our lasting sorrow and regret; therefore, be it

Resolved, That the Hardware jobbers of Philadelphia take this means of testifying their regard for the character of their late friend and co-worker, Henry Knight, who, in his long connection with the Hardware business in Philadelphia, made himself so well and favorably known to all the trade, attaching to himself many close and personal friends.

Resolved, That we feel that our trade has suffered a loss which is to many of us personal, and that we shall ever bear in mind his courtesy, and now testify to the kindly thought in which his name will be held in remembrance, and that we here tender to his bereaved family our sincere sympathy.

Resolved, That copies of these resolutions be sent to his family, and also to his late friends.

MICHIGAN RETAIL HARDWARE DEALERS' ASSOCIATION.

HEREWITH we give a portrait of Arthur J. Scott, the newly elected secretary of the Michigan Retail Hardware Dealers' Association. Mr. Scott is a

ARTHUR J. SCOTT.

member of the firm of Scott Bros. & De Lisle, Marine City, Mich., dealers in Hardware, Stoves, Ship Chandlery, &c.

NOTABLE ORDER FOR BUILDERS' HARDWARE.

THE RUSSELL & ERWIN MFG. COMPANY, New Britain, Conn., are engaged in making the finishing Hardware for the Bellevue-Strattford Hotel, Philadelphia, the order for which was recently obtained by their agents, William H. Cole & Sons, Baltimore, Md. It is believed that the value of the Hardware required is in excess of that which has entered into the construction of any other building. The Bellevue-Strattford Hotel will have 20 stories, and will occupy an entire block on Broad street, Philadelphia. There are more than 2500 hundred windows and about 2700 doors. The Hardware contract was given by the Fuller Construction Company, the corporation who have attained a national reputation in the erection of first-class buildings. The translation of plans of such volume and the following up of the delivery of the goods until the time of their application to the various openings, considering the speed with which buildings of this size are completed, constitute a prodigious task, which has become a specialty with manufacturers who compete for similar orders. Charles E. Bristor, who secured and will supervise the order mentioned, is widely known in connection with work of this character.

STORE ARRANGEMENT.

The Holder-Athey Hardware Company.

IN Fig. 1 of the accompanying cuts is shown the plan of the salesroom on the first floor of the establishment of the Holder-Athey Hardware Company of Bloomington, Ill. The room is 48 x 99 feet in size, with a ceiling 16 feet 10 inches high. There are plate glass windows at both ends, the rear opening on Post Office court, so that the store is thoroughly lighted throughout. The arrangement of plate glass in the front end of the building is illustrated in Fig. 2, showing glass both above and below the awning. All the show windows are open except the one at the extreme right, permitting an unobstructed view from the sidewalk to the interior of the store. All counters and fixtures are of golden oak. The salesroom is virtually divided into two parts by the shelving in the center extending half way to the ceiling, leaving open spaces at the front and rear entrances, as shown in Fig. 1. The stock is arranged so that each class of goods is together, which is found to be a great convenience. Thus in a general way Hardware and allied goods are on one side of the central shelving, while Stoves and House Furnishing Goods are on the other side. In Fig. 3 is shown the right hand side of the store, looking from the rear to the front. The shelving on the left hand side is 16 inches deep, devoted to Builders' Hardware. The wide middle counter has lockers for Transom Lifts on one side and on the other side are bins for Strap and T Hinges. The top is used in season for measuring Wire Cloth, the top being marked off for this purpose. The

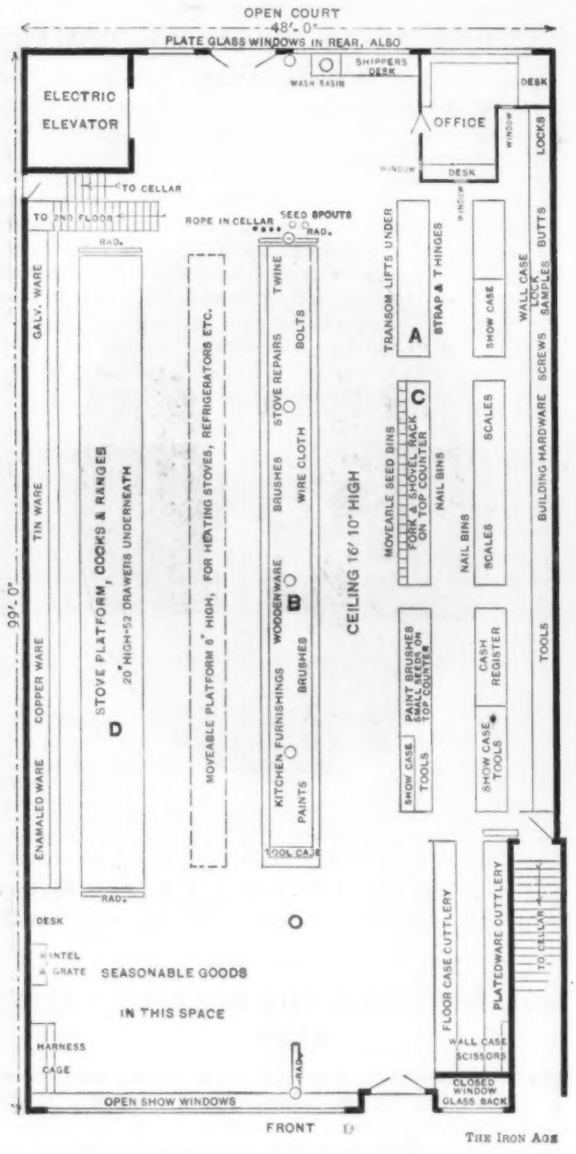


Fig. 1.—Salesroom, Holder-Athey Hardware Company.

Fig. 2.—A Portion of the Store Front.

next middle counter has Nail bins on one side and on the other side are galvanized iron movable Seed boxes.

Fig. 3.—Right Hand Side of Salesroom.

On the top of the counter is a rack for Farm and Garden Tools. On the third floor are two large wooden

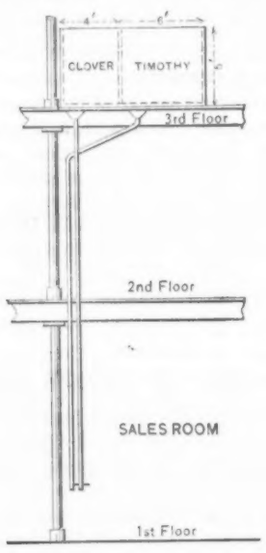


Fig. 4.—Clover and Timothy Seed Bins.

bins for Clover and Timothy Seed, with two 3-inch tubes to convey the Seed to the first floor, with cut offs at the bottom of the tubes, as shown in Fig. 4. The

next counter has drawers for Tools on one side and for Paint Brushes on the other side, while on the top of the counter are movable shelves for small tin boxes containing bulk Garden Seeds. All the Seeds are removed

Fig. 5.—Left Hand Side of Salesroom.

as soon as the season is ended. The shelving on the right hand side is devoted to Bolts and Heavy Hardware. On the top of the center shelving are kept Wood Rim Sieves, Baskets, Coal Hods and other bulky goods of this character, as shown in Fig. 5. This shows the

Fig. 6.—Mantel Room.

left hand side of the salesroom, looking from the rear to the front of the store. Directly in front of the electric elevator, seen in Fig. 1, are stairs to the cellar and also to the second floor. On the left hand side is the center shelving, 8 feet high, 5 feet wide at the base and

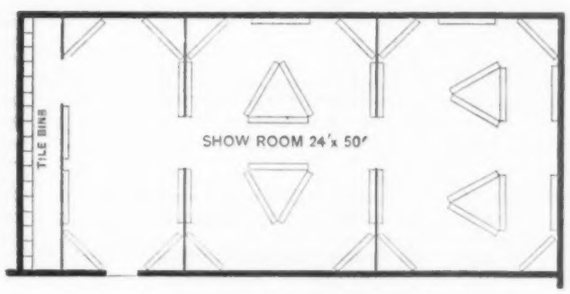


Fig. 7.—Arrangement of Mantels.

3 feet 6 inches wide at the top. Stove Repairs are kept under the ledge, and above is Wooden Ware and Kitchen Sundries. In the center of the aisle is a movable platform 6 inches high, used for Stoves in the fall and for Refrigerators in the summer. The shelving on the right hand side is for Granite and Tin Ware, with a Stove platform in front of it 5 x 60 feet in size, 15 inches high, with 52 drawers for Brushes, &c., underneath. The cellar or basement has a 9-foot ceiling and is used for Nails, Rope, Oils, Barb Wire, Wheelbarrows, Churns, Grindstones, &c. On the second floor is the Carriage repository, occupying 48 x 75 feet of space, with a 12-foot ceiling. On this floor the stock of Mantels is also kept, a portion of the room being shown in Fig. 6. This room is 24 x 50 feet in size, and for economy of space the Mantels are arranged as shown in Fig. 7, permitting 40 to 50 to be carried in stock. The third floor is used for a tin shop and for storage of surplus stock. The ceiling here is 17 feet high at the front and 12 feet at the rear. The entire building is heated by steam.

HIGH GRADE LOCKS OF TWO PERIODS.

P. & F. CORBIN, New Britain, Conn., and 11-13 Murray street, New York, have recently come into possession of two unique old Locks taken from Heeswijk Castle, in North Holland. One of them, two views of which are here reproduced, has been suitably mounted on a hardwood sample board alongside a Corbin Unit Lock to better demonstrate the strides made in Lock making since the sixteenth century. Both are types of the age that produced them, one the product of an age of force, strong to withstand assaults, but giving little protection against cunning and skill in Lock picking; its companion, the Twentieth Century Corbin Unit Lock set of heavy cast bronze parts and burglar proof mechanism, capable of being quickly ap-

Two Views of a Sixteenth Century Lock.

plied by inexperienced labor without taking apart and making a handsome appearance when in place.

The wrought Lock was hand forged throughout, and it is estimated would require three weeks of a skilled workman's time to duplicate, costing as much as a dozen of the Corbin Unit Locks. It is 8¼ x 11½ inches in size, and measures 2⅞ inches from the end of the outside tube to the inner surface of the Lock. The key is 5⅞ inches long and 2⅜ inches across the bow. The wrought Lock weighs 16 pounds and the key 8 ounces. The Corbin Lock complete, consisting of two knobs, two escutcheons and Lock with latch bolt and dead bolt, weighs but 6 pounds, the miniature key in comparison weighing but half an ounce. The antique Lock is strong and massive, with hand forged parts throughout, including the plates and knobs, the marks of the hammer being plainly discernible. The knob is affixed to the latch bolt and slides with it as in the ordinary modern cupboard catch. When the knob is pushed back to withdraw the bolt a hole is uncovered, into which a pin can be thrust to hold back the bolt. There is no knob on the outside of the Lock, a second turn of the key withdrawing the bolt and performing this knob function, as in some modern front door Locks. When the key is turned to lock the door the bolt is thrown forward double the distance when used as a latch, rendering the knob inoperative. A pressure upon the end of the bolt will not force it back, the key being required to withdraw it.

One of the Locks is conspicuously displayed at their New York store, and the other has been sent to their Chicago branch.

Butler & Hagaman have succeeded Wm. Butler in the retail Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods business in North Branch, Mich.

PRICE-LISTS, CIRCULARS, &c.

G. W. COLE COMPANY, 141 Broadway, New York: Catalogue of Bicycle Accessories. These include Three-in-One Oil, Lubricants, Toe Clips, Bicycle Holders, Repair Kits, Baby Seats, Luggage Carriers, &c.

JOHN W. BUCKLEY, 69 Warren street, New York: Rubber Goods for mechanical purposes. A catalogue and price-list includes Hose, Belting, Packing, Gaskets, Valves, Tubing, Pneumatic Tires, &c.

BARLOW MFG. COMPANY, Holyoke, Mass.: Supplement C to illustrated catalogue. The supplement relates to Display Fixtures for store interiors and show windows.

KING POWDER COMPANY AND PETERS CARTRIDGE COMPANY, Cincinnati, Ohio: 1902 edition of the "Handy Book for Trap Shooters and Sportsmen." The work contains a description of the plants of these two companies and their products. There is also a careful compilation of the game laws of the United States, the Interstate Association rules governing inanimate target shooting and live bird shooting, trap rules of the American Shooting Association, systems of dividing money, class shooting or percentage system, hints to beginners on guns and game shooting, rules governing rifle and pistol competitions and directions for organizing a gun club and conducting a tournament. The book can be obtained free of charge from any dealer in Peters Ammunition by application to the main office at Cincinnati, Ohio, or to the main office at Cincinnati, Ohio, or to the Eastern Eastern agency, 80 Chambers street, New York.

TRUE & BLANCHARD COMPANY, Newport, Vt., issue an illustrated catalogue, No. 3, in the interest of their retail Hardware, Sporting Goods and jewelry business. It is 9½ x 12 inches and contains 30 pages.

THE D. W. BOSLEY COMPANY, 303-311 Fulton street, Chicago, for whom John H. Graham & Co., 113 Chambers street, New York, are the Eastern selling agents, have issued an illustrated catalogue of a comprehensive line of Rubber and Felt Weather Strips, together with various styles of Rubber Window Cleaners, Floor Scrubbers and Counter Cleaners. A new line with them is a Single Edge Weather Strip in six different styles and widths. Another specialty brought out some time ago is the Atlas Creased Metallic Weather Strip, put up in 100-feet lengths coiled, in boxes 16 inches square, so that whatever is wanted can be pulled out and cut off, thus avoiding waste. They also make to order special styles of Weather Strips of wood and rubber, in genuine oak, imitation walnut and polished mahogany, together with a Weather Strip Packing for refrigerators, ice boxes and coolers.

LEE-GLASS-ANDREESEN HARDWARE COMPANY, Omaha, Neb.: Annual catalogue, season of 1902-03, illustrating, with prices, a line of Stoves and Ranges.

THE MILLER COMPANY. Vassar, Mich.: The improved Lohr & Wildt Bean Picking Machine. A circular illustrates and describes the machine, which is designed for hand picking beans, peas, coffee, &c.

F. E. MYERS & BRO.

THE second annual picnic of the employees of F. E. Myers & Bro., Ashland, Ohio, was held on Saturday, 16th inst., at Silver Lake. More than 2600 excursionists participated, and the occasion was a most successful one in every respect. The company refer to the attitude of their employees and friends as exceedingly complimentary, and the interest manifested in the picnic as showing a state of affairs that is highly appreciated by the concern, demonstrating, as it does, that the relations between employers and employees are exceptionally cordial. On Monday evening, 18th inst., at the residence of F. E. Myers, a reception was tendered to P. A. Myers, who had just returned home after an absence of over two months, during which time he visited England and the principal European countries.

John De Young has sold his Hardware and Farm Implement business in Adams, Neb., to Miller & Kahm.

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THREE NEW AUSTRALIAN TRANSCONTINENTAL RAILROADS.

THE announcement from Australia that the merging of colonial interests in the union known as the Commonwealth of Australia has given a mighty impetus to railroad building, has much that is highly significant to American manufacturers. The obliteration of sectional lines, a uniform law and tariff for all and a governor-general and central legislative body (Parliament) remove the barriers to a freer interstate trade, whatever effect it may have on foreign importations through the building up of Australian home industries. In any event it means a larger market and the United States can give a good account of itself in competition with foreign rivals, especially after the present great home demand is met.

What originally were the colonies of Victoria, New South Wales, Queensland, South Australia, Western Australia and Tasmania, are now as unfettered for trade purposes as the States of our own Union, whereas 20 months ago they were practically as foreign to each other, in a way, as the countries of Europe are to each other.

New Trunk Line Railroads Authorized.

One result, so far, of broad statesmanship and prevision is the completion of plans for three transcontinental railroads, the building of the lines authorized by legal enactment and the beginning of the work we are advised is in sight.

That means to Australia, in kind if not in degree, what the building of the Union Pacific-Central Pacific Railroad meant to us 30 odd years ago, the results of which, with added growth developed by the numerous other existing transcontinental parallel roads, are now obvious to all. It means the development of a great expanse of farm and mineral country, with the numerous railroad feeders sure to follow, in a continent slightly larger than the area of the United States, by the brightest and most energetic people in the Antipodes and per capita one of the largest consuming communities on earth.

Australia as a Future Market

Australia is a good market now, although the United States has not had the proportion of traffic it is likely to get in the future. With two transcontinental lines bisecting it from the south and southeast to the north and northwest, and a third overland route welding together the populous eastern portion with rich but sparsely settled Westralia, the results must be marked.

Sir John Forrest, the first postmaster-general of the commonwealth, is said to be the author of the project, now sanctioned, to extend the southern system of railroads clear across the south part of the continent, creating a connection between Sydney on the east and Perth on the west coast.

The Transcontinental Line Connecting the East and West Coasts.

Port Augusta, at the northern point of Spencer Gulf in South Australia, is now the western terminus of the South Australian railroads. A line, 1068 miles in length, is to be built along the coast on the southern edge of the Great Victoria Desert to Port Eucla, the frontier town between the States of West Australia and South Australia, and thence northwest to the well-known gold mining center of Kalgoorlie, which already has a railroad connecting it with Perth, the capital of West Australia, on the west coast. It is expected that this line, built along the level coast, may be quite cheaply constructed, estimated at something over $10,000,000.

A Transcontinental Line from South to North Coast.

A railroad has been for a long time in operation between Port Augusta (about 200 miles north of Adelaide) and Oodnadatta, farther north in the State of South Australia. The best harbor on the north coast of the continent is Port Darwin, the outlet for the neighboring gold and tin mines and the landing place of two of the cables connecting Europe with Australia, the overland wires of which follow in a general way the proposed railroad route. A railroad from Port Darwin, 145 miles long, extends southeast to Pine Creek, in the heart of the mining region. Pine Creek and Oodnadatta are to be the termini of the new north and south railroad across the heart of Australia, and approximately through the center of South Australia, which extending from the north to the south coast is about central between the east and west coasts. When the road is completed the journey may be made from Adelaide to Port Darwin, a distance of 1896 miles by rail.

A Transcontinental Line Connecting the East and North Coasts.

The second transcontinental line north and south will have the same terminus on the north coast, Port Darwin, but will follow a line east of the central route. The town of Bourke is now the terminus in the northwest of the railroad system of New South Wales. A railroad will be built in a comparatively straight line between Bourke and Pine Creek (southeast of Port Darwin)) its direction being northwest and southeast. It will be 1600 miles long, and its completion will link Sydney with Port Darwin by a continuous railroad 2247 miles long.

PLUSH TOP DISPLAY BOXES.

In Fig. 1 of the accompanying cuts is illustrated a series of plush top display boxes which the Clauss Shear Works, Fremont, Ohio, furnish for the display of their goods in their customers' showcases. As shown in Fig. 2, the hinged covers of the boxes are covered with red silk velvet plush, and are provided at one end with a tape for raising them, and with a label for marking the length of the goods, cost and selling prices. This end

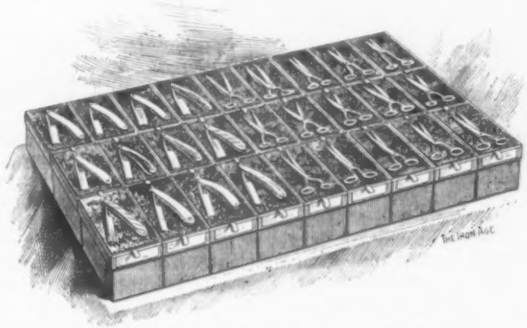


Fig. 1.—Display Boxes in Showcase.

of the box is placed in the case facing the salesman, so that there is no necessity of moving the boxes to obtain information or to get at the stock which is kept in the boxes beneath the covers. The boxes are all of the same hight and all are 3 inches wide, but are made in three different lengths, to accommodate 5-inch pocket scissors, 7-inch scissors, 9-inch shears, also razors. A row of three boxes will extend across the case, and a multiple of three boxes in a row will fill the showcase for any required distance, presenting an even surface for

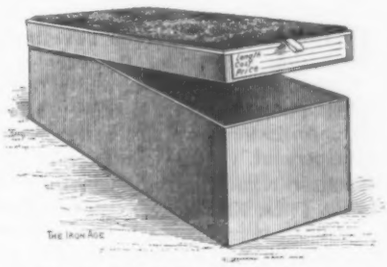


Fig. 2.—Plush Top Display Boxes.

the display of the goods. Samples are placed, one each, on the top surface of the box, enabling the dealer to dispose of the sample, thus having clean goods to sell, and permitting him to see the amount of stock on hand at a glance by looking in the box. For instance, an 8-inch box holds 12 pairs of shears or trimmers. The boxes are furnished to customers carrying a line of the company's goods.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

Jas. S. Byrd and W. R. Lowry, Hardware dealers, of Jonesboro, Tenn., and Jas. S. Byrd & Co., in the Hardware line at Johnson City, Tenn., have consolidated their interests under the style of Byrd-Lowry Hardware Company, with main store at Johnson City and branch at Jonesboro. The new concern intend to do both a retail and jobbing business and request catalogues and other printed matter from manufacturers.

Broadfoot-McKendree Company have just been organized at Ada, I. T., for the purpose of carrying on the Hardware, Agricultural Implement and Wagon and Buggy business. The new house consists of E. H. McKendree, formerly salesman for M. H. McKoy of Rockwall, Texas, and W. G. Broadfoot, formerly of the firm of Broadfoot & Latimer, Forney, Texas. The new firm would be pleased to have catalogues, &c., relative to the above lines.

THE AXE, HANDLE AND GRINDSTONE CONSOLIDATION.

THE negotiations for consolidating the interests of the leading manufacturers of Axes, Axe Handles and Grindstones, which have been under way for some time, are believed to be rapidly approaching a consummation. The promoters, whose headquarters are in New York, are reticent, but the Louisville *Times* of the 22d inst. contains an article on the subject of which the following is an abstract:

Charles D. Gates, president and general manager of the Turner, Day & Woolworth Handle Company, has just returned from New York, where he conferred with capitalists who are promoting a $25,000,000 company, to take in all the Axe manufactories, Handle manufactories and Grindstone factories in this country and Canada, the mills to be operated under one management.

Plans for the formation of the new company have been perfected, and arrangements have already been made to take over the larger works, though the transaction may not be finally consummated for several months. Men of great wealth are interested in the project, which is to be financed by a New York trust company.

An offer of $1,000,000 has been made for the Turner, Day & Woolworth Works, but Mr. Gates refused to discuss the matter further than to state: "You can say that such a deal is on. A proposition has been made to this company, but as for discussing the matter in detail or its probable outcome, I cannot do so."

Despite the unwillingness of Mr. Gates to talk, it is stated on good authority that matters have so far progressed that options have been given on most of the plants desired.

DISSTON'S NEW LUMBERMAN'S HANDBOOK.

HENRY DISSTON & SONS, Philadelphia, Pa., have just issued their new lumberman's handbook for free distribution. They have issued a handbook for many years, and from time to time have added to its store of information concerning the care and use of Saws, as well as some general data and a few views of sections of their plant, their main object, however, being to furnish information of practical value to all users of Saws. The present volume contains 175 pages, including information regarding Band, Circular, Cross Cut and Hand Saws, Files, Knives, &c. Under each of these headings the subject is treated in detail. Saw Tools are given a large amount of space. The book is fully illustrated, and will prove of much value to those who use or handle Saws.

Hamilton & Hamilton, Oskaloosa, Iowa, have sold out to the Hamilton-Messenger Company, who have been incorporated with a capital of $50,000. The officers of the new concern are as follows: J. W. Russell, president; G. H. Messenger, vice-president, and V. E. Hamilton, secretary, treasurer and general manager.

AMONG THE HARDWARE TRADE.

W. J. Van Petten has bought the Hardware, Stove, Tinware and Sporting Goods stock of John Stanley at Elmwood, Ill., and will continue this long established business at the old stand. Mr. Van Petten has been identified with the lumber business of Elmwood for the past ten years.

E. L. Rasberry has succeeded Hamilton & Rasberry in the retail Hardware, Stove, Tinware, Agricultural Implement and Wagon and Buggy business in Rockdale, Texas.

C. S. Watson has lately engaged in the Hardware, Farm Implement and grocery business in Salt Fork, O. T.

Guy W. Hacker is building an addition to his Hardware store in Superior, Wis.

Kutschback, Holman & Hoch, in the wholesale and retail Hardware, Stove and Implement business in Taylor, Texas, have been succeeded by the Holman & Hoch Hardware Company.

The Hughes Hardware Company have engaged in business at Cushing, O. T., handling Shelf and Heavy Hardware, Stoves, Tinware, Paints, Harness and Sporting Goods.

D. J. Bond has opened a new store in Prague, O. T. Mr. Bond's stock comprises both Shelf and Heavy Hardware, Tinware, Stoves and Agricultural Implements.

W. H. Elliott and R. A. Horton have entered the Hardware business at Laceyville, Pa., under the style of Horton & Elliott.

M. M. Tullis & Co., Driftwood, O. T., have opened a general store, handling Hardware, Stoves, Farming Implements, groceries, &c.

W. A. Roach has purchased the Hardware, Stove and Agricultural Implement business of J. M. Summer & Son, Paris, Texas.

Wright Hardware Company, Rosebud, Texas, have been incorporated with a capital stock of $20,000. The company are dealers in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, Buggies, Wagons, Wind Mills, &c.

Henry & Roberts Bros., a stock company with a capital of $12,000, have succeeded J. L. Henry in the Hardware, Stove and furniture business in Centralia, Mo. They are erecting a new brick building, 50 feet wide and 100 feet long, two stories high.

MISCELLANEOUS NOTE.

Stropine.

W. P. Field, who is now and for the past 20 years has been identified with the New York branch of George Wostenholm & Son, and long covering the principal markets in the United States as far West as the Rocky Mountains, is marketing McGrew's Stropine, manufactured by the McGrew Stropine Company, Cincinnati, Ohio, in which business Mr. Field has an interest. This dressing, in paste form, is designed for rubbing on a razor strop, and is equally suitable for either the black or red sides. The application of this paste moistens, lubricates and preserves the leather. In use but a little should be applied and thoroughly rubbed in. The manufacturers guarantee it not to injure the finest strop or razor. It is neatly put up in white porcelain jars with nickeled screw cap, the jar being 1 x 1¼ inches in dimensions and is designed to retail, profitably, at 10 cents a jar. Inquiries may be sent to the address above or to W. P. Field's home address, P. O. Box, 36, Babylon, N. Y.

Robertson's Germ Proof Automatic Cleaning Filter.

The Robertson Mfg. Company, 203 West Utica street, Buffalo, N. Y., are offering the filter shown in the accompanying cuts. The filtering medium is an imported diamond rock, in tube or cylinder form, giving a filtering

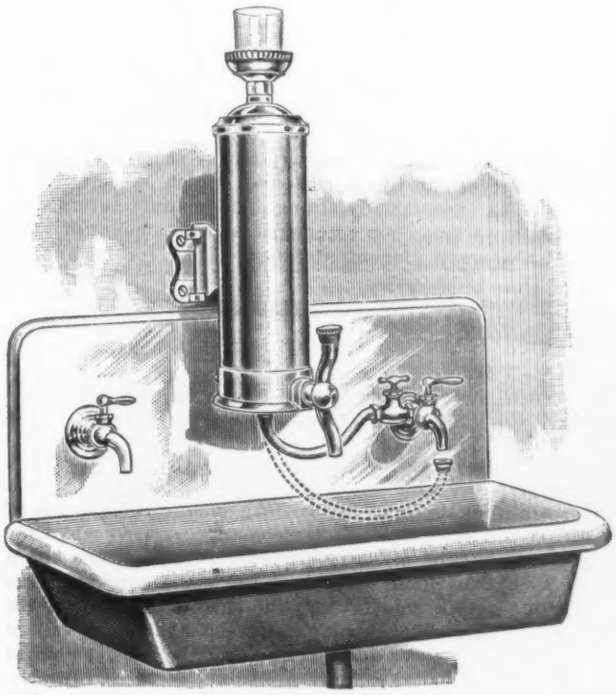


Fig. 1.—Robertson's Germ Proof Automatic Cleaning Filter.

surface of 9 x 2¾ inches. The rock is a crystallized substance, but at the same time, it is explained, very fine grained and porous, insuring no absorption and admitting of complete and perfect cleaning. This is accomplished by reversing the turn stem, after removing the cap, causing a reverse action in forcing air and

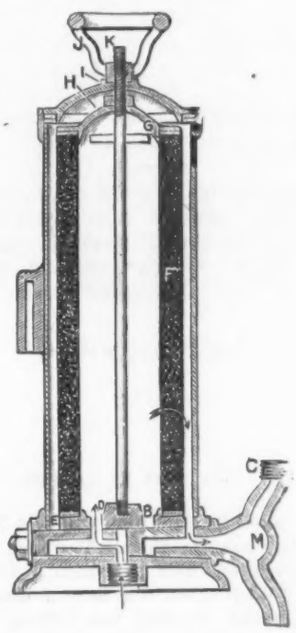
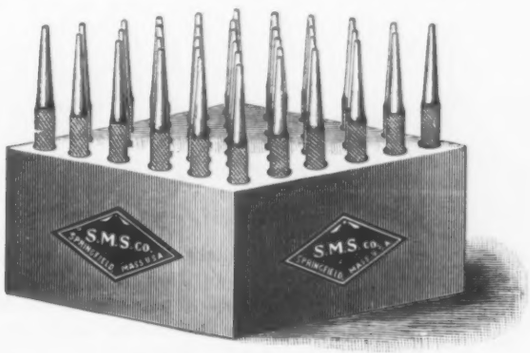


Fig. 2.—Interior Construction of Robertson's Filter.

water through the filtering medium, loosening and removing instantly, it is remarked, any and all matter or germs deposited on the rock surface, which is carried off through the port indicated in Fig. 2. It is pointed out that the surface of the filter is as readily cleaned as the smooth surface of glass, that a brush is not required and that it is unnecessary to take the filter apart to clean it. The top, shell and turn stem are nickel plated, while the base and cap are enameled. For convenience in connecting there is a wall plate in which the bracket of the filter adjusts itself so that it may be lifted out any time. The filter is furnished in various sizes and capacities for house supply, public buildings, hotels, &c.

Nail Sets and Saddlers' Punches.

The Springfield Machine Screw Company, Springfield, Mass., are placing on the market nail sets and saddlers' punches, as shown in the accompanying cut. The box is of wood, neatly covered with a cardboard cover, and is thrown away on opening the package for display. A box contains three dozen and is alluded



Nail Sets and Saddlers' Punches.

to as making a very attractive display in a showcase, giving dealers an opportunity to buy full assortments of all sizes of saddler punches from 1 to 16 in one box, or a full assortment of nail sets. The manufacturers remark that two or three of the boxes placed side by side show up very nicely, and in their opinion advertise the goods.

The Perfection Scraper.

The accompanying cut represents a scraper for cabinet work, floors, boxes and butcher blocks, put on the market by E. C. Atkins & Co., Indianapolis, Ind. The advantage possessed by the scraper, it is pointed out, lies in the fact that pressure can be brought to bear directly over the scraping edge, thus giving better results. The scraper blade can be removed from the

The Perfection Scraper.

holder, and is readily adjustable without the use of screws. The scraper is referred to as a perfect tool, simple, durable and effective.

Moore & Hawkins is the name of a new Hardware firm who will do business at the former stand of Orton, Smith & Moore, Elgin, Ill. Messrs. Orton and Smith have withdrawn from the firm, and Leo Hawkins has entered into partnership with Mr. Moore under the above style. Mr. Hawkins studied civil engineering at the University of Michigan, leaving there about a year ago to accept a position in the bridge department of the Chicago, Milwaukee & St. Paul Railway. The firm expect to put in a new store front, new fixtures and to largely increase the stock, which comprises Shelf Hardware, Stoves and Tinware, with heating, plumbing, furnace work and gas machine department.

Winchester Repeating Rifles.

The Winchester Repeating Arms Company, New Haven, Conn., have adapted the Winchester model 1895 box magazine repeating rifle, as shown in Fig. 1, to handle a new smokeless powder cartridge, known as the Winchester .35 caliber, illustrated in Fig. 2. This is referred to as a powerful shooting cartridge at both long and short ranges. Rifles for this cartridge are made with 24-inch round nickel steel barrels, thus being handy for hunting purposes. The diameter of the bore is 0.350 inch, depth of rifling 0.004 inch, and the twist one turn in 12 inches. The magazine holds four cartridges, and another cartridge can be carried in the chamber. The rifle, finished with a straight grip stock and forearm of plain walnut, weighs about 8½ pounds. It is remarked that the Winchester .35 caliber cartridge embodies high velocity and consequent flat trajectory, great energy and striking power, making it a very desirable cartridge for hunting the biggest game known. The Winchester model 1886 rifle has been adapted to handle the new .33 smokeless powder cartridge shown in Fig. 2, which is referred to as being large and powerful enough to kill any big game known. The diameter of the bore of the rifle is 0.330 inch, depth of rifling 0.004 inch, and the twist is one turn in 12 inches. The rifle is made in solid frame or take down style, with a 24-inch round nickel steel barrel, straight grip stock of plain wood, shot gun butt and rubber butt plate. The rifle with a half magazine will hold four cartridges and one in the chamber. A full magazine rifle will hold seven cartridges in the magazine and one in the chamber. The gun weighs about 7¾ pounds. The .33 caliber bullet weighs 200 grains, and with the load of special smokeless powder used develops a muzzle velocity of 2,050 foot-seconds and a muzzle energy of 1,868 foot-pounds.

Fig. 1.—The .35 Caliber Winchester Repeating Rifle, Model 1895.

Fig. 2.—Cartridges for .33 and .35 Caliber Winchester Repeating Rifles.

Ohio Steel Scoop Tray Wheelbarrow No. 40.

The Ohio Steel Wheelbarrow Company, Toledo, Ohio, for whom C. M. Avery & Co., 165 Lake street, Chicago, Ill., are sales agents, are offering the wheelbarrow shown herewith among their line of all steel barrows. Angle steel is used in the construction of the barrows to insure strength and durability. The wheel is directly underneath, to balance the load and relieve the arms of workmen of any noticeable strain. The barrows are shipped knocked down. Illustrations are given in Fig. 1.

Fig. 1.—Ohio Steel Scoop Tray Wheelbarrow No. 40.

Fig. 2.—Bent Steel Spokes and Wheel.

2 of the steel spokes bent triangular shape and the triangular spoke wheel complete, which is referred to as being exceptionally strong. The manufacturers state that a workman can accomplish a large amount of work with a small amount of fatigue; that, for instance, a strong boy 18 years of age can handle 600 pounds of coal in their 6 cubit foot scoop tray barrow, while the usual limit of ordinary barrows is 450 pounds for a strong man in a barrow of the same capacity. The point is made that because the barrow dumps over the wheel, material can be dumped up against a wall or curb or anywhere desired; also that the construction of the barrow makes it strong, yet light. The barrows are peculiarly suited for use at mining camps and mills, factories and by contractors.

The "Ask Me" Button.

The Norvell-Shapleigh Hardware Company of St. Louis, Mo., have adopted the lapel button shown herewith, to be worn by all of their traveling salesmen and store employees during the next 30 days, the opening of the fall trade. The buttons will also be given to dealers when they ask for them. The idea is that when a dealer inquires of their salesmen "Ask you what?" he replies, "Why about our line of diamond edge cutlery." The dealer wearing the button, when asked in turn what it means, answers, Why ask me about our leading farm wagon, our best range, our St. Louis barber razor, or whatever item he has decided to bring to the attention of his customers. The button is believed by the company to be an original idea with them, and they express their willingness to send one of the buttons, free of charge, to any dealer in hardware, sporting goods or cutlery upon application.

The "Ask Me" Button.